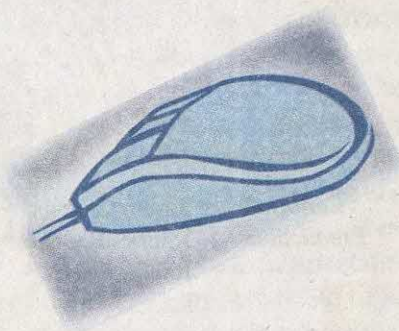# LEARNING WITH COMPUTERS

Level II

Learning
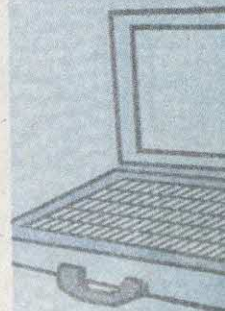# with
Computers

Level II

UTPAL MALLIK

NCERT

राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

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COVER AND LAYOUT

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Rs. 85.00

Foreword

THE perception of the role of computers in school education has undergone a radical metamorphosis during the last four decades. Today information and communication technology (ICT) is widely accepted as a set of tools for lifelong learning. Its ability to create an exciting learning environment and greater learning opportunities across the curriculum calls for our overall efforts to make it an established component of schooling. Advances in the technology, its declining cost and its diffusion in society have created an encouraging climate for this integration.

The *National Curriculum Framework for School Education–2000* (NCFSE–2000) took a fresh look at various issues concerning the role of ICT in education in India. The Framework proposed integration of ICT into the school curriculum for enhancing the quality of education and at once strongly pleaded for professional development opportunities for teachers.

Soon after the publication of the Framework, the Council developed *Information Technology in Schools: Curriculum Guide and Syllabus* and made it available at its website before publishing it as booklets in English and Hindi. This publication not only embodied the ideas generated by the Framework, it also translated them into a model for approaching ICT competencies within the context of subject areas. It suggested the IT competency standard for general education and listed desired skills and activities to achieve them at different grade levels.

The present series consisting of three books is based on the Curriculum Guide and Syllabus. The books are so designed that they would take children through the experience of using the technology in a wide variety of contexts. Each book contains extensive Notes and Appendices for teachers as well. I hope both students and teachers find the series useful.

The title 'Learning with Computers' makes it apparent that these are not books on computers *per se*. Rather, they are expected to help students use information and communication tools for learning, within the framework of the school curriculum and beyond.

Each book generates a large number of activities involving the use of various ICT tools. It is unlikely that all of them can be performed in all schools. The available infrastructure and the confidence that teachers show in handling a class that uses ICT tools for learning are the factors that will decide to what extent these books will be used and at which grade level. They are meant to support ICT-based activities in primary, upper primary and secondary classes (i.e. for general education). But they are flexible and suggestive rather than rigid and prescriptive. Indeed Level I is for the beginner, wherever she/he is, and Level II for the more advanced user. Level III should guide one apply ICT tools in a wide range of exciting group activities as well as in the classroom and laboratory situations.

I congratulate all those associated with the project on the successful completion of the job within the stipulated time.

The technology changes so fast that almost everything about computers is ephemeral. But the approach to the technology adopted in these books is likely to lend them a longer life. I hope it will be some time before they outlive their utility.
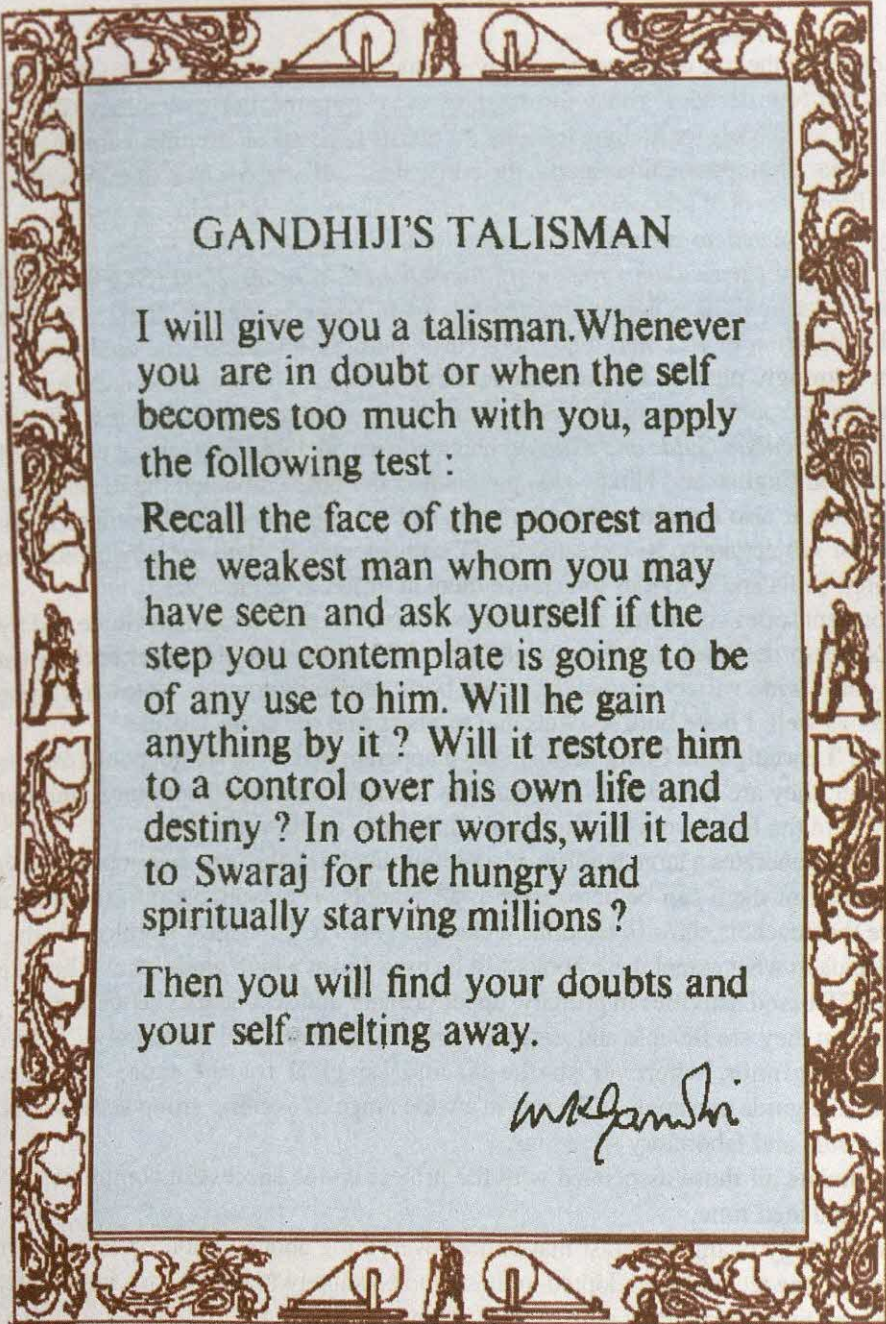
J.S. RAJPUT
Director
National Council of Educational
Research and Training

New Delhi
December 2001
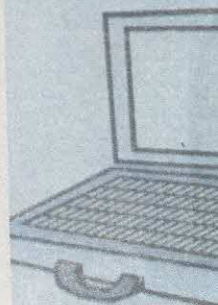
GANDHIJI'S TALISMAN

I will give you a talisman. Whenever you are in doubt or when the self becomes too much with you, apply the following test :

Recall the face of the poorest and the weakest man whom you may have seen and ask yourself if the step you contemplate is going to be of any use to him. Will he gain anything by it ? Will it restore him to a control over his own life and destiny ? In other words, will it lead to Swaraj for the hungry and spiritually starving millions ?

Then you will find your doubts and your self melting away.

M.K. Gandhi

Preface

THE information and communication technology skills we seek to promote through the use of these three books, *Learning with Computers*, Levels I, II and III, are aligned to the objectives of integrating the technology into the school curriculum envisaged in the *National Curriculum Framework for School Education–2000*. Based on *Information Technology in Schools: Curriculum Guide and Syllabus*, the scope and sequence of ICT-based activities suggested in this series of books cover a wide spectrum of technology applications in the classroom. This should encourage schools to plan their programmes according to the resources available to them.

These books are not to be read and remembered, or forgotten. They are for learning ICT skills and applying them in the context of various subject disciplines. This idea defines the scope of all three books and is rather pronounced in Level III. For making the best use of these books, the teacher's role is vital. Some of the applications challenge the user's creativity. Computing is no spectator sport.

We hope these books would prove as useful for teachers as for students. First, at the end of every chapter, there is some additional note for the teacher, either on an ICT tool or on the activities that can be performed using the tool or both. Secondly, there are appendices for teachers at the end of each book. One of these appendices offers tips for assessing children's learning outcome. In Levels I and II, appendices contain useful information on technology support available for children with special needs.

The software tools used in these books for illustrating various ICT applications are not without alternatives. But widespread use and easy availability are a strong argument in favour of the selection. We have used the most commonly used programs and hardware equipment.

Participants of the review workshops, comprising teacher educators and teachers from different states, met twice to review the draft manuscripts of these books. Their valuable suggestions have improved the manuscripts.

Debjani Ghosh (Intel Asia Electronics Inc.) waded through the manuscripts of all three books and gave her comments, which I highly value. Dr Sugata Mitra (NIIT's Centre for Research in Cognitive Systems) encouraged us to use the Microcomputer-based Laboratory (MBL) kit developed by his team. We developed the chapter titled 'Collecting Data in Digital Form' in Level III around some of the activities that one can do with the kit. Neera Datta and Sanjay Gupta of Dr Mitra's team offered useful suggestions on the chapter based on their kit. We thank them all.

The Rehabilitation Council of India has most generously permitted the use of excerpts from the article 'Computers in Our Classroom' by Windy L. Buckley which appeared in *RCI News* (Vol. 2, No. 2, August 2001) and which we have used in Level II. I thank RCI and the author of the article.

Dr Kamlesh Mittal compiled from several sources the available IT support for children with special needs (Level II); Dr Asha Jindal put together the glossary for all three books. They are also co-authors of the Level III book, along with Dr S.K. Gupta of the Department of Computer Science and Engineering, IIT Delhi. I am thankful to them for their contributions.

My colleagues in the Publication Department, NCERT, especially the team of editors and production personnel, most ungrudgingly handled the manuscripts that were unwieldy with technicalities.
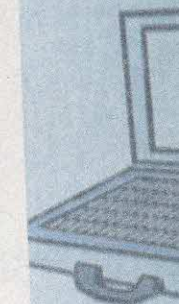
Jhunurani Das and Praveen Tyagi, two young computer assistants, were associated with the project all through and helped in various ways the development of the manuscripts. I appreciate their total dedication to the work.

I have borrowed short texts from a number of authors: Jules Verne (*From the Earth to the Moon*, Arco Publications 1965), Herman Hess (*Siddhartha*, Macmillan India 1973), George Mikes (*How to be a Guru*, Penguin Books 1986) and Sukumar Ray (*The Select Nonsense of Sukumar Ray* translated by Sukanta Chaudhuri, Oxford University Press 1987) to illustrate some text processing and DTP operations.

I am grateful to Professor J.S. Rajput, Director, NCERT. His keen interest and constant encouragement made us put our best into the project.

<div align="right">

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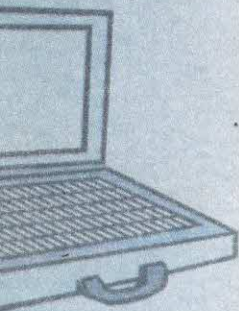
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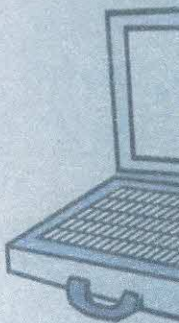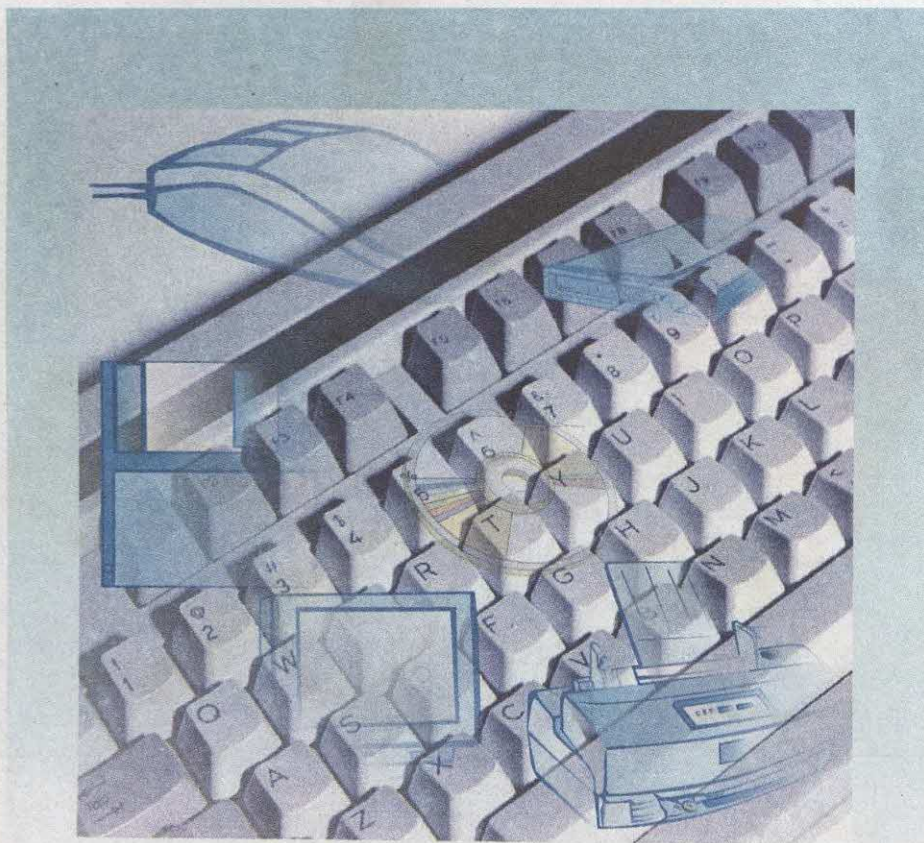
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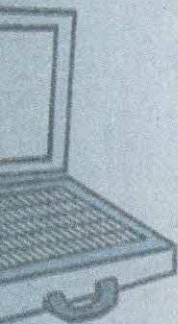
The Computer and Its Peripherals

Learning Objectives

- ☐ Naming and describing functions of the basic units of a computer system
- ☐ Describing internal and external storage devices
- ☐ Explaining general ideas and the terminology relating to computers
- ☐ Naming and describing functions of commonly used computer peripherals
- ☐ Using some of the peripherals available in the school
- ☐ Explaining network-related terminology
- ☐ Logging in, working on and logging out of a local area network
- ☐ Sharing resources and exchanging data in a network.

A computer system is made of three basic units: **Input Devices**, like the keyboard and mouse, the **Central Processing Unit** (CPU) and **Output Devices** like the monitor screen, printer, speakers, etc. Figure 1.1 is a block diagram that shows the three units. The Central Processing Unit is at the heart of the computer system. Since the processing unit is *central*, the input and output devices connected to it are called *peripherals*. In this Chapter, you shall have a brief introduction to some of the peripherals. You shall use some of them in connection with various activities suggested in this book.
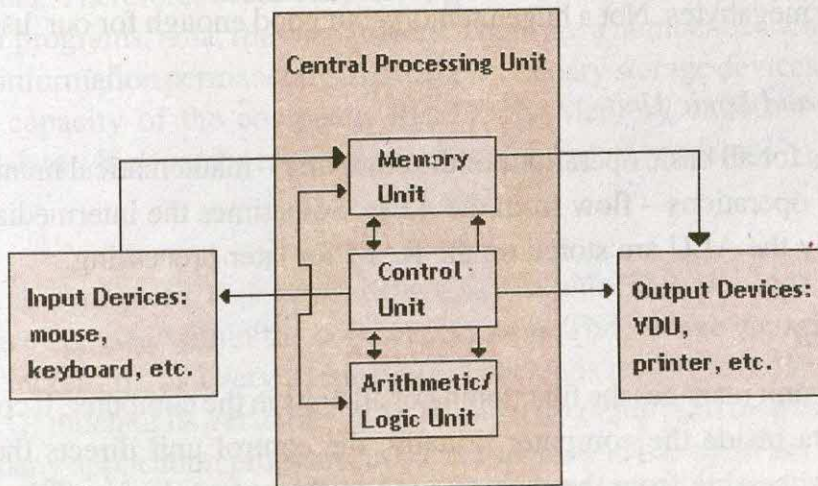
Fig. 1.1 The block diagram showing the three units of a computer
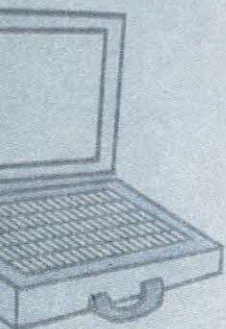
But the block diagram does not say much. Does it? We need to know what each of these units does and what they do together.

Input Devices

An input device accepts instructions from the user or data from the environment for processing. The function of an input device is to convert the input into a form that the computer accepts. The mouse and keyboard are the most widely used input devices. Examples of other input devices are microphone, scanner, bar code reader, etc.

The Central Processing Unit

The main 'work' of the computer—processing data by arithmetic and logical operations—takes place in the CPU. The CPU accepts input data, processes it and produces the output information. The CPU also controls operations of other units of the computer. The CPU has three subunits, namely, *Memory Unit, Arithmetic and Logic Unit* and *Control Unit.*

Memory Unit

Data and instructions accepted by the computer are stored in the internal memory of the computer before they are processed. The internal memory is classified into **Random Access Memory (RAM)** and **Read Only Memory (ROM)**. The memory unit consists of many locations; call them cells. Each of these cells has an address. So every piece of data that enters the computer has an address.

The unit of memory is called *byte*; a byte is like a word in a piece of writing. When we say that our machine has 32 MB RAM, we mean that the capacity of the RAM is 32 megabytes. Not a huge memory, but good enough for our use.

Arithmetic and Logic Unit

Instructions for all basic operations of the computer – mathematical manipulations and logical operations – flow from the **ALU**. Sometimes the intermediate results produced by the ALU are stored on the RAM for later processing.

Control Unit

The control unit manages the functioning of all units in the computer. It coordinates flow of data inside the computer. Finally, the control unit directs the flow of results of processing from the memory unit to the output device. Take a look at the Figure 1.1 once again.

Types of Processing

You can think of two different ways of processing information:

On-line Processing : When the CPU is processing *currently* input information, e.g. in real-time processing, where information is continually input and immediately processed. This also results in immediate output. For example, you can use a probe to record the rising temperature of a system. If this probe is connected to your computer, you shall get the changing temperature of the system displayed on the screen simultaneously. You shall do some experiments in Level III with science probes that are good examples of real-time processing.

Off-line Processing : Such processing takes place when the CPU is not processing the currently input information, e.g. batch processing which takes place when the input information is accumulated into sizeable batches before being processed. The processing is then done, of one batch of information at a time.

Output Devices

Output devices receive, in the coded form, the results of computer processing. They convert the results as visual images on the **Visual Display Unit (VDU)** or as print on papers or as sound coming through speakers, depending on which output device you are using.

More on Memory

The internal memory/primary memory has limited storage capacity. Primary memory is of two kinds, RAM and ROM. RAM is a volatile memory. As soon as you shut down your computer, or the power goes off for some reason or the other, whatever data was stored on the RAM disappears. It is temporary memory, hence it does not help store data. Therefore, **secondary storage devices** are necessary, where we can store our programs, data, files and folders. There are a number of such devices, which store information permanently. All these secondary storage devices increase the storage capacity of the computer. Read Only Memory or ROM contains programs or data which can be read but not changed. Hence *read only*.

Hard Disk

A hard disk is a magnetic disk kept inside a sealed unit. This is a high capacity storage device encased within the computer system. The storage capacity of the hard disk is increasing by every passing day. This lends the present day personal computer (PC) much of its versatility. It is the capacity of the hard disk that allows us to store many application programs in the computer and use them as necessary. Probably the capacity of the hard disk in your school machine is 10 or 20 GB (gigabyte; 1 GB is 1024 MB).

Do not un-plug cords or cables from the computer while it is on. This can stop your computer from working.

Give the computer time to respond to your single clicks or double clicks. Be patient. Clicking a number of times does not expedite any process.

Floppy Disk

A three and a half inch floppy disk is the most common secondary storage device used today. It is called floppy disk because it is made of material that is flexible (although it is encased inside a hard plastic cover). The storage capacity of a floppy disk is 1.44 MB. In order to use a floppy disk, you must have a floppy drive in your computer (which *almost* all desktop computers have). When people share a computer with others, they often store their files on floppies. A copy of files on floppies keeps files safe, without the fear of being erased or deleted from the hard disk accidentally.

A portable device called **Zip Drive** is a high capacity substitute for a floppy drive. It is a small and easy to carry equipment that uses very high capacity disks, barely larger in size than a floppy disk, on which we can store 100 MB or 250 MB of data.

Peripherals and Ports

Peripherals are devices for input, output or both. You are familiar with mouse and keyboard among the input devices and the visual display unit and the printer as output devices. Here is a brief introduction to some more common input and output devices. You shall use some of them later as you work with this book.

The *graphic tablet* is commonly used input equipment. It allows you to draw picture on your monitor. When you allow pressure on the pad, the spot lights up at a corresponding point on the screen. The computer has not only lit up the screen, but it has remembered where it is lit up. This information is input through the graphic tablet. The cricket commentators often use this device when they describe some finer points on the field or the trajectory of a ball. We see this on the TV.

Joysticks and *games paddles* are, again, input devices. They allow you to put information into the computer. You use joysticks, say, to move a helicopter around the screen or for similar activities.

The *scanner* is one of the most widely used input devices. It applies a light source to the image placed on a glass pane inside. The image can be simple text, drawing, a halftone picture or a photograph. The light reflects back from the image into the scanner optics. The image is then reconstructed digitally and displayed on the screen. You can now save it on your computer. You can also increase/decrease the size of the image and edit it.

You may be already familiar with *Optical Bar Readers* (OBR). The OBR translates the information contained in a bar code into information sensible to CPU. Bar codes are a series of black and white lines on various products available in the market, especially on the back cover of books, tags on objects in the
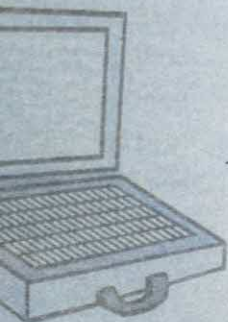
supermarkets, packages, etc. They are a digital display of information about a product, including its price. This information cannot be deciphered by the naked eye. Only the optical readers can read it. OBR is an input device that reads bar code for the computer. The entire process is very fast.

Optical Character Recognition (OCR) device reads information by recognising shapes. The instrument used to read the information is called an OCR wand which can read both words and pictures.

Optical Mark Recognition (OMR) device is used to read marks made by pencil on a sheet of paper. Unlike OCR, OMR recognises position rather than shape. A typical use of this would be to mark a complete answer sheet for a multiple-choice test.

Magnetic Ink Character Recognition (MICR) device is very similar to OCR except that the sensing device operates by reading shapes printed with magnetic ink. A typical use of MICR is for reading the numbers at the bottom of a bank cheque.

Magnetic strips are the narrow brown strips found on the back of a credit card. These contain information coded in the form of magnetic marks and are read when the card is inserted into the machine that reads it.

Floppy drive and *CD drive* are at once input and output devices. By reading information stored on the surface of a floppy or a CD, the computer is using these drives as input devices. But when we write information on a floppy or a CD for long-term storage, we are using these drives as output devices.

Most probably, the computers in your school have CD drives. That is where you insert CDs when you need to work with them. CD writers are devices that do everything that your CD drive does. In addition, with the CD writer, you are able to write on a CD, i.e. save your files on a CD.

It is good to know that there are two types of blank CDs available in the market. One is called recordable or write once CD (CD-R). This is less expensive. The other one is re-writable (CD-RW) and costlier. The steps to write on CD are not a great deal different from writing on a floppy. They are:

- Insert blank CD into the drive of the writer
- On the Desktop, double-click **Create a CD** icon
- In the dialog box that appears, choose **Make a Data CD** option and click **OK**
- In the next dialog box, indicate whether you are using CD-R or CD-RW; click OK
- Select Data CD if you have to save data; choose Audio CD if you are going to save sound
- The next window asks you to indicate data source. Indicate the source, file/folder on the top window

Magneto-Optical (MO) disk drive is another popular removable storage device. The disk has the same diameter as that of a floppy (3.5").

Almost all CD ROMs require you to install some software on the hard disk to run the program on it. Place the CD into the drive with the label side up. Follow on-screen instruction to install the software. Restart the computer via the Shut Down Windows Dialog box.

- Select **Copy** option from **Edit** menu
- Click the **New CD Layout**
- Select **Paste** on the lower window
- Go to **File** menu and select Create CD option.

When the process of copying is complete, the CD will come out on its own. However, minor details of the process may differ in different models of CD writers. For checking the content of the CD (whether the entire file/folder has been written), you should insert the CD into the drive of the system and double click on the CD drive icon.

The output devices that you have already used are the Visual Display Unit and the **Printer**. The VDU displays what you input into the computer as well as the output of processing. The screen output is soft output. The printer output is called a hard copy.

All these input and output devices are connected to the computer through sockets called **ports**. These ports are either *parallel* or *serial*. Parallel ports carry eight lines of data simultaneously. They are wider and faster. Serial port is a single line for the passage of data. A serial port is slower.

Network of Computers

We have been talking about working on a single computer. But it is likely that the computer laboratory in your school has machines that are connected to each other, forming a network of computers. There are different types of networks for differnt types of jobs. When the network connects computers within a small area, the system is called a Local Area Network (LAN). In a LAN, computers are located on the same floor of a building or in different floors of the same building. Computers are located relatively close to one another and are connected with each other through a cabling system so that computing resources can be shared.

In contrast to LAN, a Wide Area Network (WAN) is spread over a larger geographical area (like across cities, different locations within a city, across buildings, etc.) The railway reservation system that spreads across the country is an example of wide area network.

A network serves two basic purposes:

- Sharing information
- Sharing computer resources.

In an organisation, there may be many departments or sections. These departments not only generate a lot of information by themselves, but they also require information from one another. A network enables to keep all information at one place and then provides access to all the departments to share this information. Resources like printers, plotters or scanners can also be shared by a number of users at the same time if they are connected through a network.

Types of LAN

There are two types of LANs, viz. **Peer to Peer Network** and **Client Server Network**.

Peer to Peer Network : In a peer-to-peer network there is no centralised server for managing the rest of the network. Each *node* has a copy of the network software that enables it to communicate with the rest of the nodes on the network. Any of the computers on the network can host any resource, be it a printer or a local hard disk. The advantages of peer-to-peer network are

- easy to share drives and peripherals
- easy installation
- no dedicated server required
- usually low-cost.

Client Server Network : In a client server network, a central file server program controls the complete network with respect to sharing of data and resources. In a server-based network only one computer has the network operating system. Each of the workstations (nodes) may use, say, Windows 95/98. The name *client server* is derived from the fact that the server provides the network services and the workstations use the services as clients.

The server or file server is a powerful PC, which controls and manages the network resources. It normally performs network management functions, like

- control of the traffic of requests and messages
- security requirements
- centralised/shared hard disk storage
- control of peripherals like printers.

In a LAN, processing takes place at the individual PC workstation, but network and peripheral management functions are centralised and executed at the server.

Working in a Network

As you switch on the computer, you get a log on screen with a dialog box for your User name and Password (Figure 1.2). Enter them correctly and you get access to the network. If there is a mistake in entering these, you will be denied access.
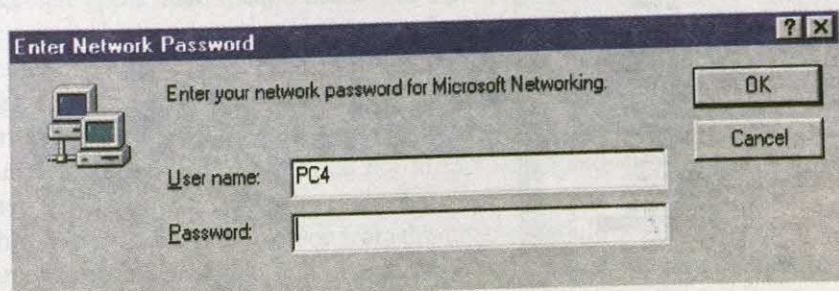
Fig. 1.2 Entering user name and password to enter into the network
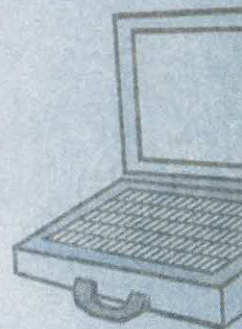
While in the network environment, you can work with application programs, share data, share different hardware resources and communicate with other users. Log out when you finish your work.

You can store your files on the hard disk of the server, which normally has large space. To retrieve your files from the server, open Network Neighbourhood, open the server and locate your file.

Fig. 1.3 Logging off the network

To log out from the system, save your work and close all files.
Go to **Start** button and click on **Log Off** option.

In a network, the workstations are connected to the file server or the *hub*. If you have to get some files from another workstation, click **Windows Explorer** and go to **Network Neighborhood** icon. Click on the icon and you get the list of users who are presently connected to the network (here user's name means user's log in name). See if the machine you wish to access is on. Double click on the machine (you have the machine number; see Figure 1.4) and locate the file you want.
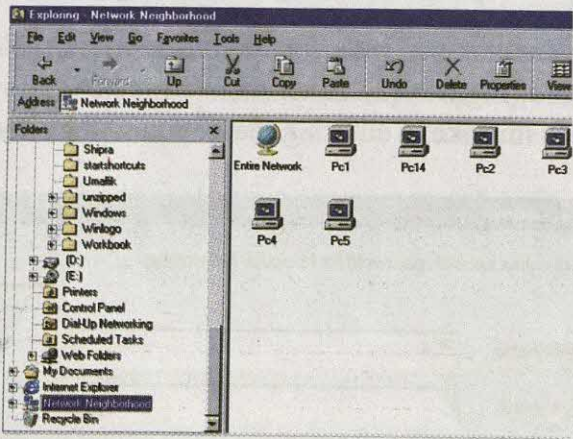
Fig. 1.4 Network neighbourhood lists machines in the network

Exercise

1. What does CPU stand for?
2. Name the components of the CPU.
3. List three different types of secondary storage devices.
4. What is an OBR device?
5. What is an MICR device?
6. What is a hard copy?
7. Explain what is a client server system.
8. Compose a letter using Word. Send it to all other computers in the LAN (if there is one in your school). Get a hard copy of the letter from the printer attached to the LAN.

Note for the Teacher

It is expected that every child who works on this book is able to make use of the resources of the computer and its peripherals. Children will do basic operations themselves, while occasionally they might require help from you. Most computer applications will centre around the use of software installed in the machine.

Uses of some of the peripherals have not been dealt with. Floppy drive is an example. You would cover such uses anyway.

Use of computer stationery, replacing them, CD and floppy care are some of the common skills to be expected of children. Keeping floppy drives free from dust is mandatory. Children should be specially drilled to take adequate care of CDs. This care includes:

- protection of recording surfaces from scratches, fingerprints and dirt
- holding of CDs by the outer edge or by the centre hole
- cleaning of CDs with soft, dry cloth. Commercial CD cleaner or ethyl alcohol can also be used
- writing only on the label side using a felt tip marker and not by a ballpoint pen
- not leaving a CD in direct sunlight or in a hot, humid location.

If the power goes off while writing the CD, children should be advised to:

- leave CD in the drive (not to open the CD tray)
- turn the machine off
- turn it on when the power comes back
- re-enter the application they were using.

Once the application tries to access the CD writer drive, the recovery operation will make it appear that the last session is there. In reality, only a part of the CD's directory may be there. The recordable CD can still be used if one can read the directory. Children can repeat the entire copy operation to make sure that the files are copied to the recordable or re-writable CD.

Finally, children may be advised not to mix audio and data files on the same CD, since they require different formats (unless one is creating mixed-mode CDs).

The other most important lesson from this chapter should be how to work in a network environment, respect protocols and others' work and share computing resources.
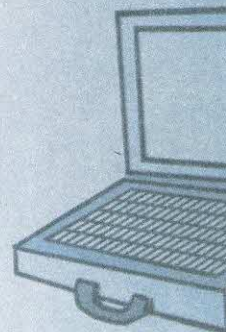
More on Windows

Learning Objectives

❑ Distinguishing between application programs and operating system programs
❑ Using some of the utilities packaged with Windows
❑ Using Windows Explorer: managing files and folders.

In the last chapter, we discussed the physical components of a computer system. These components constitute the hardware. You saw that all the processing work that goes on inside the computer is controlled by the central processing unit. But how does the CPU work? Who instructs it? Where is the instruction written?

The CPU follows a list of instructions stored in the computer's memory. This list of instructions is called program. When the CPU is working and obeying a sequence of instructions, we say that it is executing a program or software.

System Programs, Application Programs

There are basically two types of programs that we use: **system programs** and **application programs**. The system programs constitute what we call an **operating system**. As you use this book, you shall use some of the widely used application programs, like word processor, spreadsheet, Internet Explorer and more.
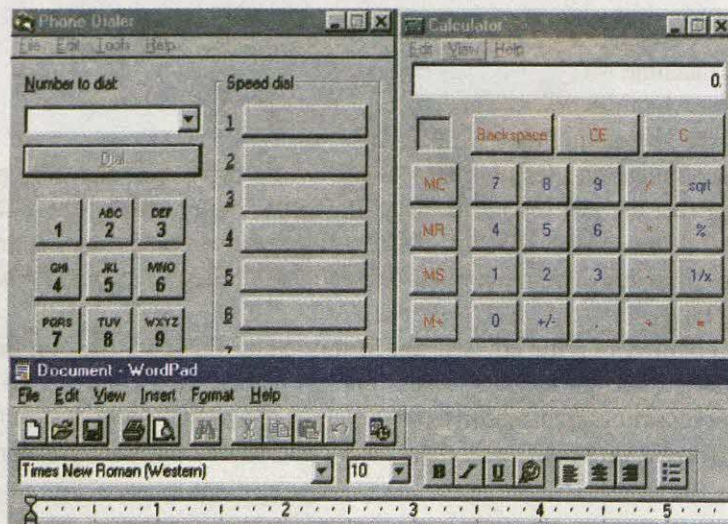
Fig. 2.1 *Windows utilities: Calculator, Phone Dialer and WordPad*

The programs that make up the operating system are:

- Control programs
- Supervisory programs
- Service programs.

The control programs control and manage all the hardware and memory resources of the computer. They regulate and time the activities of the CPU and allocate memory space when it is required. They schedule the data to be received or sent through input and output devices.

The supervisory programs control all other operating system programs and application programs.

The service programs provide services to the user. These services are many. The most common example is the set of programs that let you save files and load them from floppies or CDs and copy, rename, delete files or folders.

The operating system Windows 98, which you have already used and will continue to use, has a few application programs as part of it. You used the one called Notepad for writing text (Level I). Figure 2.1 shows three service programs or utilities that come with Windows 98. The names of these programs tell you what they do. There are more utilities/applications that come with Windows.

You can open the above applications following these routes:

Start → Program → Accessories → **Calculator**
Start → Program → Accessories → Communications → **Phone Dialer**
Start → Program → Accessories → **WordPad**

Windows: Applications/Utilities

If you used the book for Level I, you must have used Notepad for entering text (and corrected spelling errors). WordPad is a smarter program. You can format your text to quite an extent, using WordPad. It has a few facilities in common with Word. With six menus and editing and formatting facilities, it is a useful program, although not a substitute for MS Word.
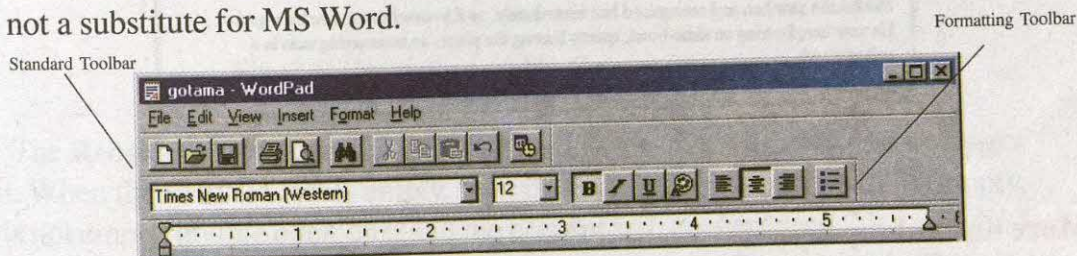
Fig. 2.2 *Standard Toolbar and Formatting Toolbar of WordPad*

Figure 2.2 shows the Standard Toolbar and Formatting Toolbar of WordPad. You can also use the Delete key and Backspace key to remove spelling errors and use font and font size of your choice.
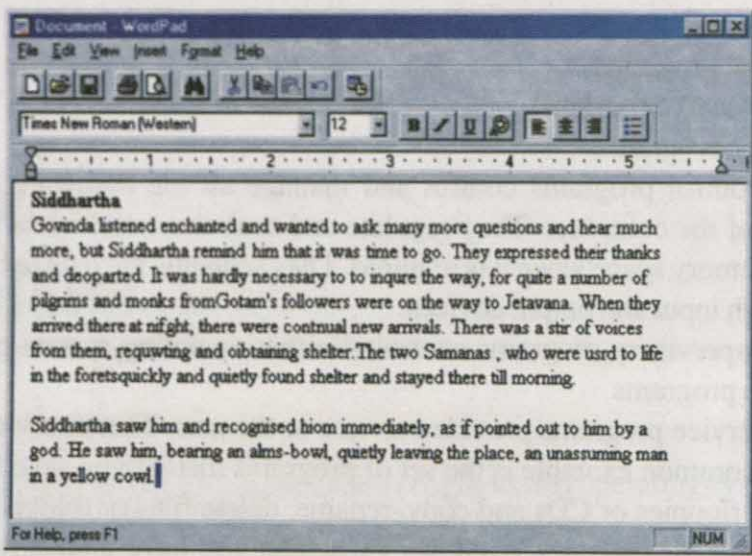
Fig. 2.3 *WordPad with a little text*

Look at the text in Figure 2.3. Yes, it contains errors. But since you have already used MS Word, it should not be difficult for you to remove those errors and give the paragraph a better look (Figure 2.4).
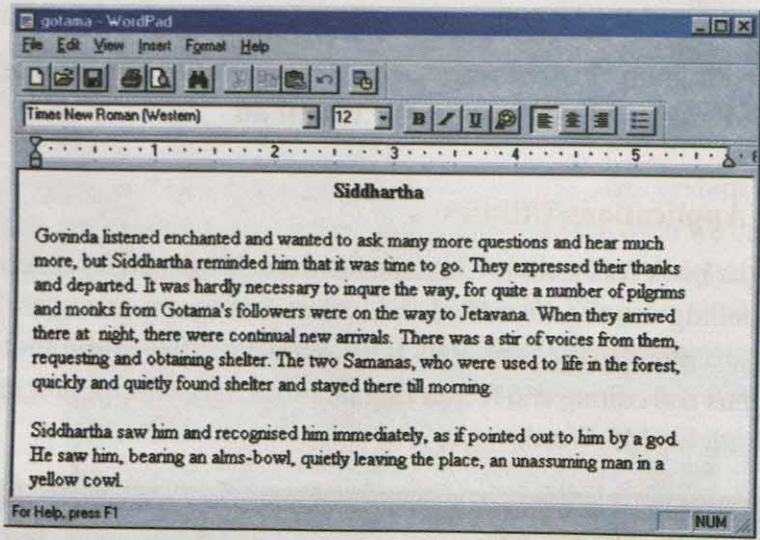
Fig. 2.4 *The edited text*

Unless you are told otherwise, click with the left mouse button whenever you are asked to click.

More on Desktop

You are already familiar with Desktop. You need a little more acquaintance with a few items on it.

My Computer is one of those items. Double click on My Computer on the Desktop. It opens up and shows you some of the resources that you have in your

computer. Look at Figure 2.5. The icons that are displayed stand for:

🖿 3½ Floppy (A:)	Floppy disk drive
🖴 Ibm_preload (C:)	Hard disk drive
🖸 (D:)	CD drive
🖳 Control Panel	The icon to change the setting of the computer
🖨 Printers	The set-up for printers and view information about printers, etc.
📠 Dial-Up Networking	Dial-Up Networking.

If you double-click on any one of the icons, you get information on what it stands for. For example, if there is a floppy in the drive, a double-click on the corresponding icon will give you the list of files that the floppy contains.

My Computer

File Edit View Go Favorites Help

← Back   → Forward   ↑ Up   ✂ Cut   📋 Copy   📋 Paste   ↶ Undo   ✕ Delete

Address 🖳 My Computer

My Computer

Select an item to view its description.

3½ Floppy (A:)   (C:)   (D:)   (E:)   Control Panel   Web Fo

Dial-Up Networking   Printers   Schedu Task:
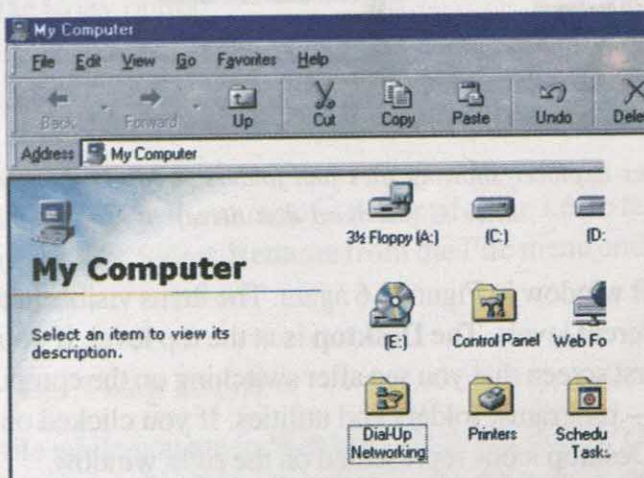
Fig. 2.5 The content of My Computer

The **Recycle Bin** temporarily holds deleted items, like a file that you no longer need. When the Recycle Bin is empty, then its icon, the wastebasket, looks empty. If it is not empty, double click on it and the content will be displayed. You may find an item that was thrown out by mistake. In that case, drag the item out of the Recycle Bin onto the Desktop. Click the **Close** button. Or, click the **File** menu and choose **Restore**.

When there are too many items in the bin and you do not need any one of them, right click on the Bin icon, choose **Empty Recycle Bin** option. Confirm with **Yes**.

Windows Explorer

It is a utility, an application program for management of files in your computer. It displays the drives, folders in each drive and the files in each folder. The easiest way to reach Windows Explorer is through the Start button → Programs → Windows Explorer or right click on the Start button then left click on Explore. Windows Explorer presents two vertical windows side by side. The left window shows how the files and folders are organised and relations between them in terms of hierarchy, i.e. which folder is within which other folder or which file is under which folder, etc. Figure 2.6 gives you the picture.
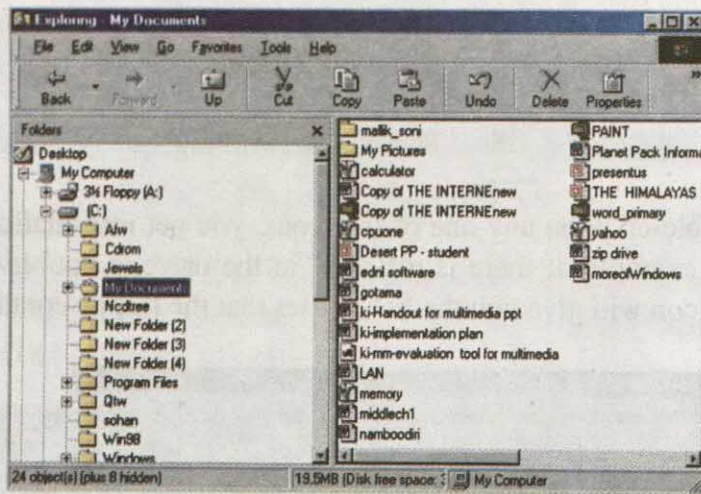
Fig. 2.6 *Windows Explorer showing files and folders in My Document, a folder in drive C (the hard disk drive)*

Look at the left window in Figure 2.6 again. The items visible in the left window are arranged at different levels. The **Desktop** is at the top level. If you remember the Desktop, it is the first screen that you see after switching on the computer. It contains a number of items – programs, folders and utilities. If you clicked on Desktop now, you would see all Desktop icons represented on the right window.

At the next level, you have My Computer. If you double-click it, you will see the content of My Computer as in Figure 2.5. **Drives** are at the next level of the hierarchy. You can see drives A (that is, floppy drive) and C (hard disk drive) in the picture. The other drive (for CD-ROM) is down below the window and is not visible in Figure 2.6. Folders are at the lowest level in the left window. Click any one of the folders and you get its content – more folders or files, probably both. In Figure 2.6, you see the folder named My Document is shown open. Its content is in the right window – folders and files of different kinds. You can see that when a folder is open, its icon also looks open (see My Document).

A plus sign (+) before a folder means it has folders or files within. If you click on +, it turns to a (–) sign and the files and folders inside it are displayed.

Handling Files and Folders on the Explorer

Managing files and folders is an important skill. When you have mastered this, you have mastered a major skill for working in the Windows environment.

You know how to create folders. You did create a few while on the Desktop earlier. This is how you open a folder on Desktop while in Windows Explorer:

- click the Desktop icon on the left window
- right-click the mouse button on the blank space on right window. Choose **New** and then **Folder**
- give it a name.

To **copy a file** for pasting it on some other location, all you need to do is:

- click on the file to be copied
- go to **Edit** menu or right click and choose **Copy** option
- choose the destination folder
- choose Paste option from Edit menu or right click and choose the option.

For **moving a file** from one location to another, you follow more or less the same steps as for copying file. The difference is that you choose **Cut** option, instead of the Copy option.

There are occasions when you do not need a file any longer and feel it should be deleted from its present location. On such occasions, select the folder where the file is. Right click on the file you want to delete. Choose **Delete** option and confirm with Yes.

In order to change the name of a file or a folder, i.e. to rename it, right-click on the folder or the file. Select **Rename** from the File menu and type in the new name. Press **Enter** key.

Opening Files Using Explorer

To open a file while you are in Windows Explorer, double click the folder in which your file is located. Double click the file or right click on the file and click on **Open** option. If your file is on a floppy, click on the drive A, select the file and double click it. Or click right button and select Open.

Exercise

1. Open WordPad and create a file named TREE having details of different parts of a tree.
2. Save that file under SCIENCE folder.
3. Copy the file TREE from folder SCIENCE to another folder PCB.
4. Open Windows Explorer and try to locate your file.
5. Delete the file from SCIENCE folder.
6. Recover it from the Recycle Bin.

Note for the Teacher

I. If children have a problem regarding hardware, software or connectivity, or they want to learn more about the operating system, first check the troubleshooters available in Windows' Help. Troubleshooters help diagnose common problems and determine how best to fix them.

II. The remarkable feature of the Windows environment is that computer operations are icon-driven, rather than command-driven. Generally, an icon represents a task. The choice of the right icon is basically a visual exercise, which is much easier than learning commands and applying them in our day-to-day work. This makes life simple for the computer-user. An increasing number of people, including you and your class, use computers as tools for doing various things. The icons create a graphics-user interface (GUI) that provides an environment in which you no longer write programs to make things happen on the machine.

In a way, this is what advances in the technology are all about. Today, computers and the programs that run them are so powerful and simple that children can use them with the minimum effort. Computing environment is becoming less and less restrictive. Windows and those programs that run in the Windows environment make it possible for more people to get more work out of computers with a little knowledge of how to program the machine. It is for us to enable children take advantage of this development in the technolgy.

Pressure
(atm)

15 Molecules
Mass = 1.8

Temperature
(K)

2

1

0

800
700
600
500
400
300
200
100
0

Press H to raise temperature
Press G to lower temperature
Press E to end

IT
Tools
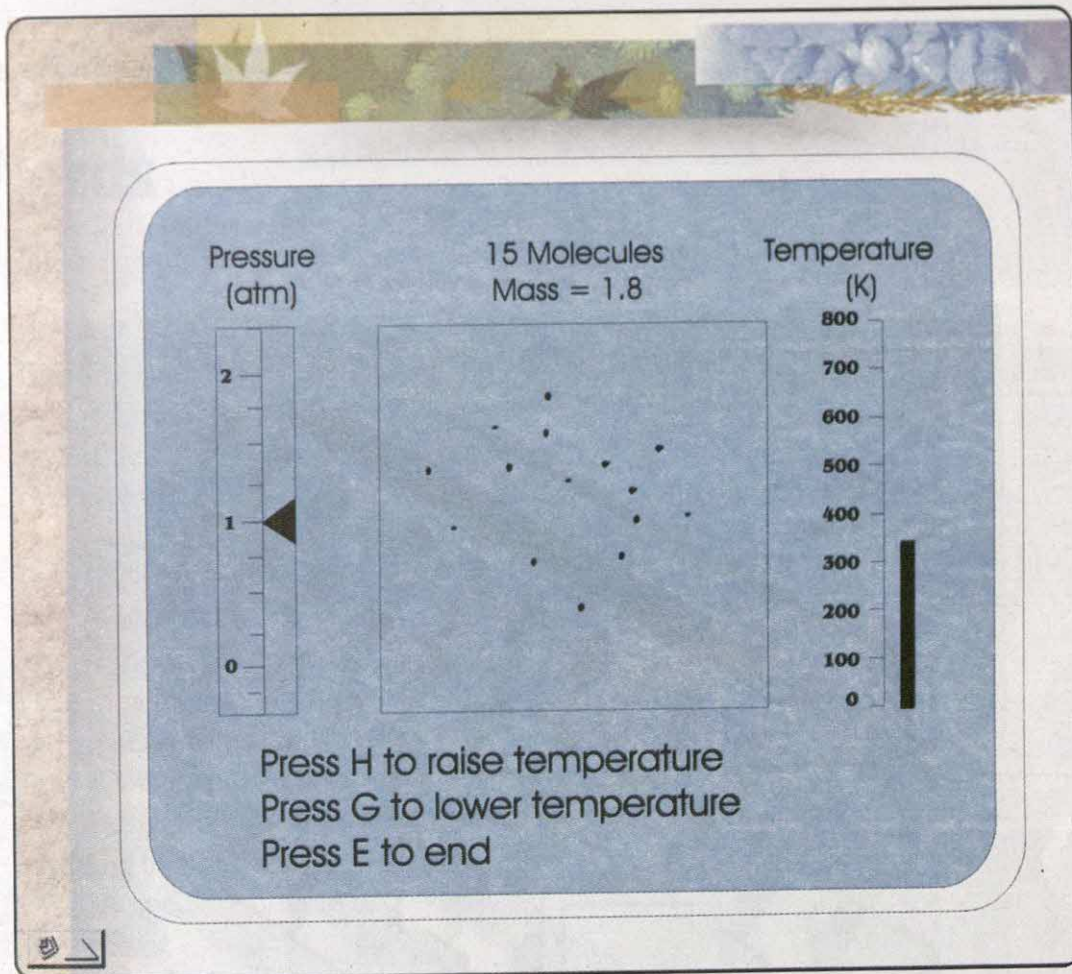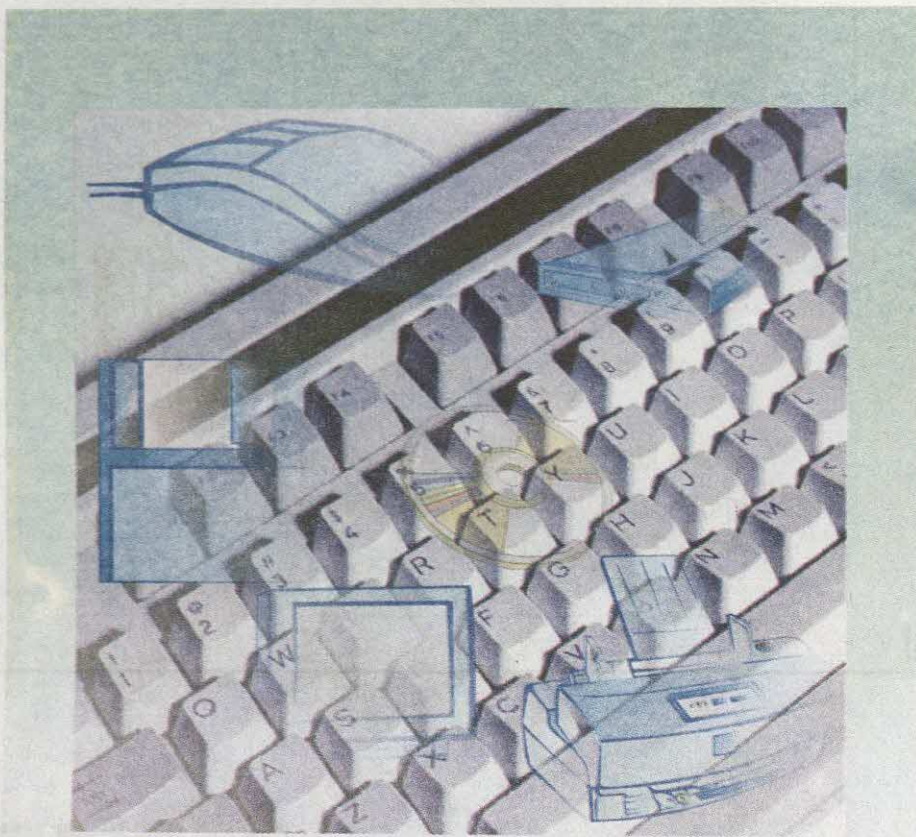
Processing Words

Learning Objectives

- ❑ Editing a document performing the following operations
  - ▪ Choose the page layout - Normal, Online, Outline views
  - ▪ Page setup: Indent paragraphs
  - ▪ Add a break: page, column, section
  - ▪ Add page numbers, date and time to a document
  - ▪ Add borders and shading
  - ▪ Change case
  - ▪ Find/Replace text
- ❑ Creating tables
  - ▪ Merge and split cells in a table
  - ▪ Delete cells, rows, columns or a table
- ❑ Checking grammar and spelling in a document
- ❑ Adding the following:
  - ▪ A special effect to text: WordArt
  - ▪ Chart
  - ▪ Object: Scanned pictures, Corel drawing, Paint image, etc.,
  - ▪ Text file
- ❑ Checking the properties of a file
- ❑ Changing the layout before printing the document
- ❑ Previewing a document before printing
- ❑ Using Word menus.

In your earlier lessons in Level I, you had learnt some basic operations on the word processor MS Word. In this session, you will use some of the more advanced features of the word processor.

More on Editing a Document

You have done some basic editing of a document. Here are some more editing facilities that MS Word offers.

Add Breaks, Page Numbers, Date and Time

Suppose you want a page break after you have typed a certain amount of text and want the new text to appear on the next page, or a break in the column, you use the break option. In order to break, choose **Break** on the **Insert** menu. This break can be for next page, column break, section break, etc. Choose your option, i.e. whether you want page break or column break and then click on OK button.

To insert page number, choose **Page Numbers** on the Insert menu and choose where on the page you wish the number to be inserted (Figure 3.1).
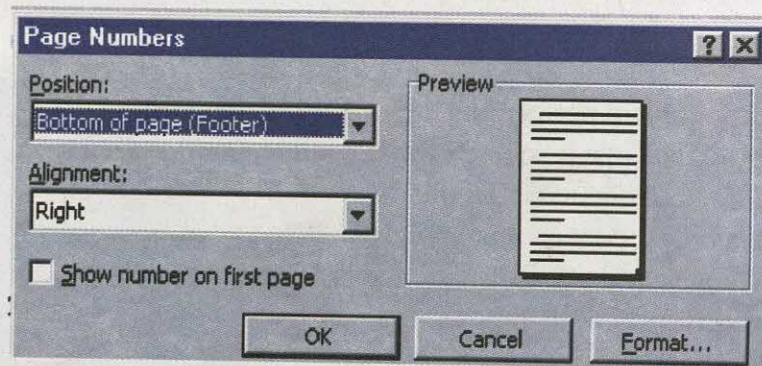
Fig. 3.1 *Inserting page number*
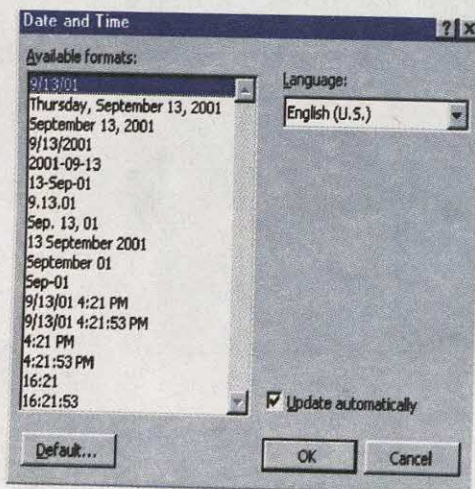
On each page of your document, you may like to insert the date and time of its composition. Place the cursor on the required position. Go to Insert menu again, choose **Date and Time** and select one out of the many available formats (Figure 3.2). For automatic updation check the check box.

Fig. 3.2 *Inserting date and time*

Set up a Page

How much space should be left blank on all the four sides - top, bottom, left and right - when you print a document created by you? It is an important consideration and depends on the nature of the document. It involves setting up the size of the margin on each side of the text. For setting up a page, select the File menu and the

Page Setup option. On the Page Setup screen, you can change the margin size as per your requirement. The margin dimensions can be changed pressing the arrow keys. There is a provision to change the left, right, top and bottom margins up to your liking (Figure 3.3).
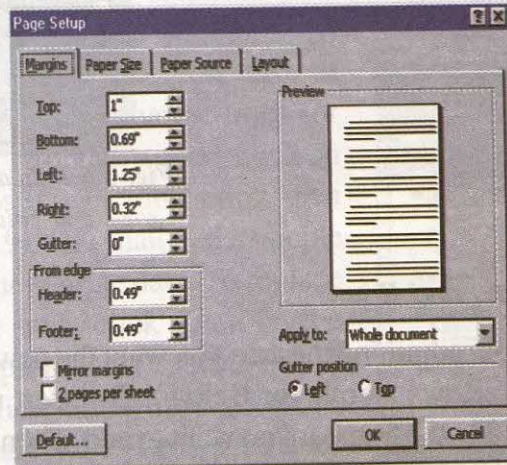
Fig. 3.3 The page setup options

Change Case

You may have a text in capital letters, which you want to change to small letters, or to a sentence case, i.e., the first letter in the sentence as a capital letter, you can use the **Change Case** option on the **Format** menu and make your choice (Figure 3.4). Confirm by pressing the OK button.
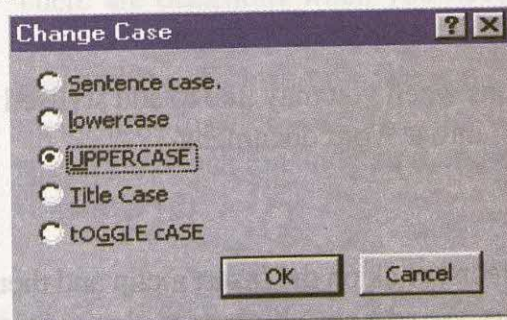
Fig. 3.4 Changing case

Work with a Table

Tables are not always for arranging numbers. Often we need tables to organise text in tabular form. In order to insert a table, click in the document where you want to place the table. On the **Menu bar** select Table → Insert → Table or on the **Standard Toolbar**, choose **Table** icon. Indicate the number of columns and rows you need (Figures. 3.5 and 3.6). If you want an additional row after you have reached the bottom of the table, just press the Tab key. You can go on doing this for additional rows.
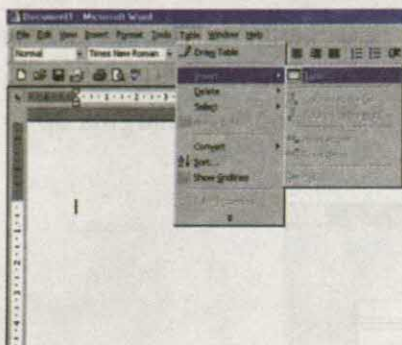
Fig. 3.5 *Insert table*

Fig. 3.6 *Indicate the number of
rows and columns you need*

Add and Delete Columns and Rows

To insert a row, click a row adjoining the area you want the new row to occupy. Then click Table → Insert → Rows Above (or Below). To insert multiple rows, select the number of rows equal to the number you want to add. Then click Table → Insert → Rows Above (or Below). For inserting a column, click inside a cell that will border the new column. Then click Table → Insert → Column to the Left (or Right). To insert multiple columns, first select the desired number of columns and then click Table → Insert → Column to the Left (or Right). To delete cells, select them with your mouse cursor and then click Table → Delete → Cells. Do not use the Delete key alone, for it deletes the text inside the cells, not the cells themselves.

Add Other Features

There are many occasions when you may like to add stylised text or a chart or any other object, even a file, into a Word document.

Insert WordArt

To insert special text effects, click on the Insert menu and then select **Picture**. One of the available items is **WordArt**, which provides special text effects. Click
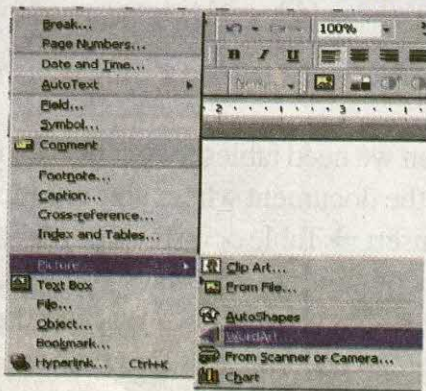
Fig. 3.7 *Choosing WordArt option*
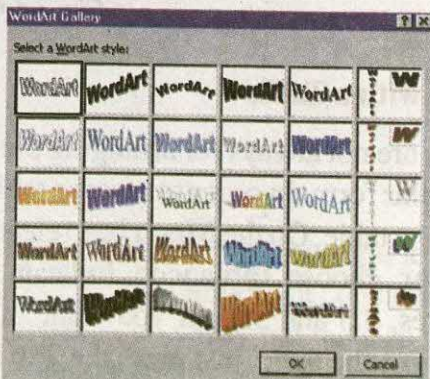
Fig. 3.8 *WordArt styles*

on WordArt (Figure 3.7). You shall see a number of font styles for writing. You can select any of the styles, size, etc. and then write whatever you want on the screen (Figure 3.8).

Insert Chart

If you have numerical data that you wish to present as a chart, Word has the facilities for converting your data. To obtain a chart, click on the Insert menu, choose the Picture option, then click **Chart** (Figure 3.9). You shall find a sample chart based upon some sample data. To replace those data with your own, click a cell on the data sheet and then type your own data there. To return to Word, click anywhere on your document. The chart will form a part of your document and the table will disappear.
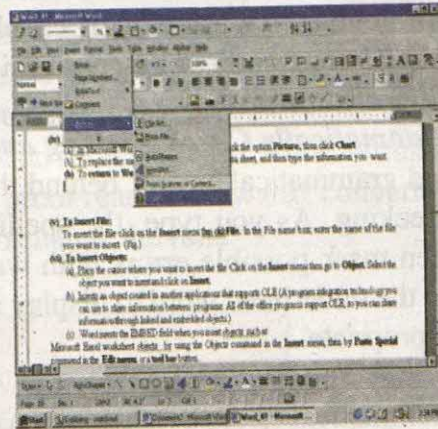
Fig. 3.9 Inserting a chart

Insert a File

There are occasions when you need to insert another file, containing text or picture, into the document on which you are working. To insert the file you need, click on the Insert menu and then choose File. In the box for file name, specify the location and name of the file you want to insert (Figure 3.10).

Fig. 3.10 Inserting a file into Word document

You can insert objects in your document through Insert → Object.

Check Spelling and Grammar

You can specify the set of grammar and writing style rules to be followed. Just select **Options** at the bottom of the **Tools** menu and then select **Spelling and Grammar**. Any of the built-in grammar and writing styles can be customised by choosing whether to apply specific rules that apply to a built-in style, such as Casual

Communication or Technical Writing. You can also create your own custom grammar and writing styles. You have several options to check spelling and grammar from :

Automatically Correct Spelling and Grammar To fix spelling and grammatical errors without having to confirm each correction, use the AutoCorrect feature. For example, if you type "definitely" and then type a space or other punctuation, AutoCorrect replaces it with "definitely". AutoCorrect can make corrections that are generated by the spell checker's main dictionary or by a list of built-in AutoCorrect entries. You can easily add your own AutoCorrect entries or remove unwanted ones.

Automatically Check Spelling and Grammar as You Type To check for spelling and grammatical errors "behind the scene," use automatic spelling and grammar checking. As you type, the spelling and grammar checkers check the text and then mark possible errors with wavy underlines. To correct an error, right-click on the underlined word to display a shortcut menu and select the correction that is appropriate.

Check Spelling and Grammar All At Once You can check for spelling and grammatical errors by clicking on the spell check icon 💹 and then confirm each correction. This method is useful if you want to postpone proofing a document until after you finish revising or editing it.

Find and Replace

You can also use the **Find** and **Replace** commands to search for and replace words in a document. For example, if you have created an assignment to use during January 2001 and now want to use the same assignment in March 2002, you can have Word find all instances of "January" and "2001" and replace them with "March" and "2002".

Add Graphics to a Document

There are two basic types of graphics that you can use to enhance your Word documents: drawing objects and pictures. Drawing objects include AutoShapes, curves, lines and WordArt. Use the Drawing Toolbar to change and enhance these objects with colours, patterns, borders and other effects.

Pictures include bitmaps, scanned pictures and photographs and ClipArt. You can change and enhance pictures by using the options on the Picture Toolbar. If you have access to a scanner or digital camera, you can insert pictures from those sources into your Word document.

To insert a picture into a document :
- Click where you want to insert the picture
- On the Insert menu, point to Picture and then click **From File**
- Locate the picture you want to insert
- Double-click the picture to insert it.

Insert Scanned Text

Sometimes a printed text from elsewhere requires to be inserted into a Word document. If the text is short, you can type it. On the other hand, if the text is long you can scan the text on a scanner. What you get is an image file, i.e. a picture of the original text.

This scanned text is not word-processed text; you cannot edit it, for it is a picture. But there is software that converts the image of a text into a word processor document. This is called OCR (Optical Character Recognition).

However, during the process of conversion of an image into text, some mistakes take place (Figure 3.11). Therefore you have to proof read the new text converted from image (Figure 3.12). You may also have to change the font.


```
Activity 19

Take two balloons of different shapes
and sizes. Tie a small piece of glass tube
to one of the balloons. Inflate the balloon
by blowing air into it. Close the glass tube
with a stop cock so that the air does not
escape. Now tie the second balloon at the
other end of the glass tube. Open the stop
cock (Fig. 2.16). What do you observe?
```
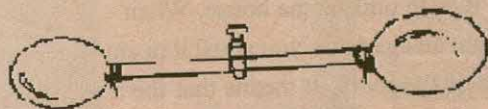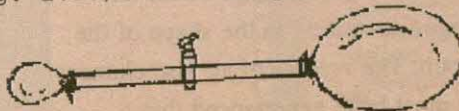
```
\   .~ ;. ;. .•     •Fts.2M '~'•'.,   ::....' '..
you Will • find ttiafthe air froro .-the
inflated balloon goes to the Other balloon
,and inflates it. The shape of the air
changes according to the shape, of the
balloon. The Volume of air also changes:
You must have experienicedthat
when firewood orcOwdung is burnt, you
smell it even outside the house. When
you light an agarbatti, you smell it in any
corner of the room. It means that the
molecules of gases move easily.    _'
```

Fig. 3.11 Scanned text and image

Activity 19

Take two balloons of different shapes and sizes. Tie a small piece of glass tube to one of the balloons. Inflate the balloon by blowing air into it. Close the glass tube with a stop cock so that the air does not escape. Now tie the second balloon at the other end of the glass tube. Open the stop cock (Fig. 2.16). What do you observe?
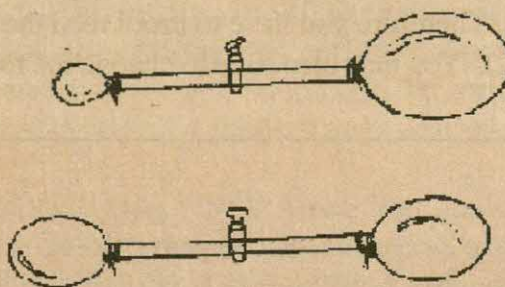
Fig. 2.16

You will find that the air from the inflated balloon goes to the other balloon and inflates it. The shape of the air changes according to the shape of the balloon. The volume of air also changes. You must have experienced that when firewood or cow dung is burnt, you smell it even outside the house. When you light an agarbatti, you smell it in any corner of the room. It means that the molecules of gases move easily.

Fig. 3.12 The text has been passed through OCR and edited

Check Properties of a Word File

File properties are details about a file that help to identify it. For example, a descriptive title, the author's name, the date on which it was last handled, etc., are important information. To view the properties of the current file, click on the File menu then click **Properties** (Figure 3.13). You can get various information, like the title, dates on which it was created, modified and accessed, the number of pages, paragraphs, lines, etc.

Fig. 3.13 *Choosing Properties option on File menu*

Print Preview

Before printing a document, especially if it contains pictures, we wish to view the overall layout of pages. This is called print preview. The process is simple. Click the **Print Preview** button on the Standard Toolbar or on the File menu (Figure 3.14). Then click Print Preview.

Fig. 3.14 *Choosing print preview*
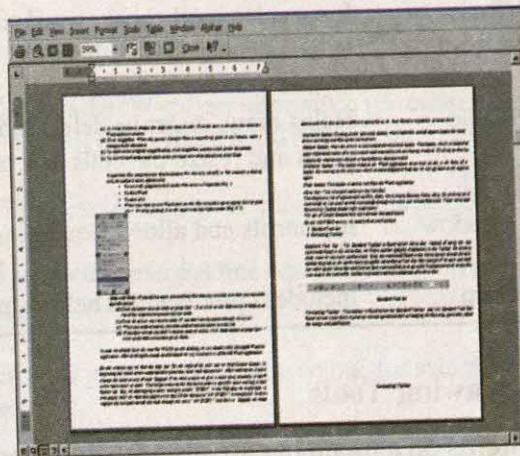
Fig. 3.15 *The preview of two pages*

Figure 3.15 shows arrangement of graphics and text on two pages. Clearly, the picture on the left page requires adjustment. Having done that, one can take a print-out of the document. Close your file and exit Word.

Word Menus

Word has nine menus. They contain all the commands to make the best use of the program. Each menu includes a group of commands related to a specific function. Table 1 explains the menus in detail.

TABLE 1

An Overview of Word Menus

Menu	Description
File	Provides commands for creating new files; opening, saving, and printing files.
Edit	Enables you to copy, cut and paste objects; undo operations; delete and find and replace words or phrases.
View	Allows you to see various layouts, toolbars, active and deactive rulers; include the header and footer in the document as well as zooms the document.
Insert	Allows to insert page break, date and time, symbols, comments, footnotes, ClipArt, WordArt and hyperlink.
Format	It controls items like font, alignment of paragraph, insert bullets and borders, columns, changes the case and background colour.
Tools	It provides spell check, word count, mail merge facilities, helps in creation of labels.
Table	Helps draw, insert or delete tables. It also merges, splits and resize the cells of a table.
Window	It controls and allows you to insert a new window.
Help	Includes commands to help in troubleshooting.

Drawing Tools

Items on a menu bar are also available on different toolbars. You are already familiar with the Standard Toolbar and Formatting Toolbar. You can consult them in the book for Level I. For this session, we have added the Drawing Toolbar, which is a valuable tool for creating graphics while you are using Word (Figure 3.16).

If you don't know what a certain tool in the Drawing Toolbar does, put the pointer on it and the name of the tool will appear.
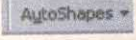
Fig. 3.16 The Drawing Toolbar

Table 2 shows the drawing tools and what each of them does.

TABLE 2

Drawing Tools : What Each Tool Does?

Tool	Name	Description
Draw ▾	Draw Menu	Displays a pop-up menu of drawing options
▷	Select Objects	Chooses objects on the screen
↺	Free Rotate Tool	Rotates the selected object
AutoShapes ▾	AutoShapes Menu	Displays a palette of shapes from which you can choose
\	Line Tool	Creates lines
↘	Arrow Tool	Adds arrowheads to the line
▭	Rectangle Tool	Creates rectangles
○	Oval Tool	Draws circles and ovals
🖼	Text Box Tool	Creates text objects
◁	Insert WordArt Tool	Allows you to draw a WordArt box
🖻	Insert ClipArt Tool	Displays the clip gallery from which you can select a category and the ClipArt you want to use
🎨 ▾	Fill Color	Fills the selected object with the colour selected
✎ ▾	Line Color	Applies the selected line options to the current object
A ▾	Font Color	Enables you to choose the colour for selected text
≡	Line Style	Allows you to choose the style of the line used in the selected object
▤	Dash Style	Creates a dashed or dotted line for the current object
⇄	Arrow Style	Enables you to choose the style of the line used in the selected object
▣	Shadow	Adds (or removes) the default shadow to (from) a selected object
◻ ▾	3D	Makes the selected item three dimensional

Exercise 1

1. You are the convenor of the magazine committee of your School. Prepare a meeting notice for the members of the magazine committee in the format given below:
   (i) Name of your School (type in lower case)
   (ii) File No.
   (iii) Date
   (iv) Title (Circular, Memo, Note, etc.)
   (v) Body text
   (vi) Designation of the signatory

Activities

1. Open your meeting notice and select Print Layout from View menu.
2. From the File menu, select Page Setup and set margins, paper size and layout as follows:
   (i) Left Margin: 2″
   (ii) Right Margin: 1″
   (iii) Top Margin: 2.5″
   (iv) Bottom Margin: 2″
   (v) Orientation: Portrait
   (vi) Layout Centre.
3. Select your school name, change it to upper case, change font to ARIAL, size to 24, centre align it.
4. Insert current date on the right side of the document using Insert menu.
5. Select the title, change it to upper case, bold and centred. Change font to ARIAL, size 18.
6. Select the body text, change it to double line spacing using Format menu, justify the text and change font to ARIAL, size 13.
7. Right align the designation of the signatory, change font to ARIAL and size 16.
8. Edit your document using arrow keys to move within the document and backspace and delete keys to insert or delete the text.
9. Use Tools menu to do the spell check.
10. Use print preview from File menu to see how your document looks and make suitable changes, if necessary.
11. Print your document using the Print command from File menu.

Exercise 2

Inserting a Table

Create your class timetable on the model given below and enter subjects and names of teachers in it.

PERIOD	1	2	3	4	12.55-	5	6	7	8
DAYS	10.15- 10.55	10.55- 11.35	11.35- 12.15	12.15- 12.55	1.40	1.40- 2.20	2.20- 3.00	3.00- 3.40	3.40- 4.20
MON					L				
TUE					U				
WED					N				
THU					C				
FRI					H				
SAT									

Activities

1. From Table menu select Insert Table.
2. Enter number of columns and rows and click AutoFormat.
3. Select a style (for example, Elegant) and click OK.
4. From the View menu select Toolbars and select Tables and Borders.
5. Select the first row. From tables and borders toolbar select Split Cells tool and enter 10 against number of columns and 1 against number of rows.
6. Enter the details into the table.
7. Use different tools in tables and borders toolbar, such as split cells, merge cells, align text in the cells, etc., to make your table look attractive.
8. Use regular style to indicate subjects in the timetable and italics to indicate the teachers' initials.
9. Select the table, choose Table AutoFormat from Table menu and try different formats.

Exercise 3

Prepare a poster for your school science exhibition using AutoShapes, insert suitable pictures from ClipArt gallery and give borders and shading to your poster using suitable tools from Format menu.

Activities

1. Prepare the rough sketch and layout of the poster and the text and pictures that will go into it.
2. Select the suitable size of paper for your poster from File menu → Page Setup → Paper Size. If suitable size is not available, customise.
3. From the Drawing Toolbar, use appropriate AutoShapes to give special effects to your poster.
4. Use WordArt from Drawing Toolbar to give special impact to the text that goes into the poster.
5. Insert suitable pictures at appropriate places in the poster from the ClipArt gallery.
6. Give suitable border and shading to your poster using the Borders and Shading option on the Format menu.
7. Preview your poster and make necessary changes.
8. Print the poster.

Exercise 4

Write an article for your school magazine in 800-1000 words.

Activities

1. Edit the text
2. Format the text to fit into two pages of A - 4 size, if necessary, by changing font size, line spacing, top, bottom, left and right margins.
3. Insert page numbers on top right corner of your document.

Note for the Teacher

Clear and organised writing is one of the most important skills. Word can help students develop those skills as well as help you with your own writing needs. Word provides an easy way to create handouts, worksheets and other printed documents and also makes it easy to save documents to the Web or send them through e-mail. This book may not include all those features of the program, but with your initiative a lot more features of Word can be explored by students than this book includes.

Word can encourage the use of a writing process from developing ideas and content, through revising multiple drafts and publishing student work. For example:

Developing Ideas and Content Students can use Word's **Outline View** to brainstorm an outline for their writing project. Outline View shows the document's organisation and makes it easy for students to restructure a document by moving text and headings up or down.

Producing Drafts Students can produce a rough draft knowing that Word offers them the freedom to easily edit and revise. Students can even save multiple drafts of their documents within the same file using the *Versions* feature, so they can easily refer to previous drafts.

Organising Documents Students can use Word Outline View to determine how well their writing is organised. In Outline View, you can collapse a document to show only the headings and body text you want. This makes it easy to view the document's organisation, move through the document and rearrange large chunks of text.

Revising Writing Students can refine their writing through individual or peer editing. With the **Reviewing** toolbar, students can easily **Insert Comment, Track Changes, Highlight Areas** of text with colour, **Save Versions** and even **Send Mail**. They can also proof read using the spelling and grammar checkers. Rewriting becomes a challenging, exciting opportunity to improve quality, rather than a time-consuming chore.

Formatting Papers Students can select styles, font sizes and colours, align and space words, bullets, numbered lists, tables and drop caps. They can set margins, borders, page borders, shading and document layout.

The following features in Word make it even easier to create documents:

Click-n-type In **Page Layout View**, one can move the cursor anywhere on a page, double-click and then start typing. This simplifies complex document layout.

Collect and Paste Students can gather information from multiple sources and place up to 12 items on the Microsoft Office Clipboard at a time.

Personalised Menus Commands that one uses most often are prominently featured on the menus. Menus are easily expanded to reveal all commands.

Tables One can create nested tables (tables within table cells), floating tables (text wraps around a table), arbitrarily positioned tables including side-by-side tables and integrated header rows (header rows integrated with the outside border).

You can explore these possibilities and share your experience with students.

Presenting Ideas

Learning Objectives

☐ Starting PowerPoint
☐ Creating slides with text
☐ Making changes in PowerPoint presentations
☐ Adding motion to presentations
☐ Adding images and charts to presentations
☐ Adding sound to presentations
☐ Closing PowerPoint program
☐ Saving slides with name
☐ Adding notes to slides
☐ Adding header and footer
☐ Changing colour and font
☐ Customising features of a slide
☐ Opening an existing file
☐ Deleting a file
☐ Printing the content of a file

The two most powerful programs for presenting ideas through screen shows are **Freelance Graphics** of Lotus Smart Suite and **PowerPoint** of Microsoft Office. Each page of a presentation prepared on either of these programs is called a slide. It is wiser to use the program that is more common so that slides developed on it can be presented at most other places.

In a PowerPoint presentation you can put in text, graphics of a wide variety, video and sound. You can add quite a bit of movement to various objects on a slide.

The most important thing about presentation of your idea is, of course, your idea. Be sure of what you are going to present. PowerPoint only makes your presentation smart, organised and effective before an audience. It cannot improve upon the idea. It requires a good deal of work before you convert your idea to the PowerPoint format.
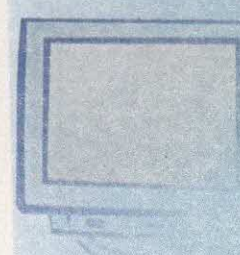
Start PowerPoint

To start PowerPoint, click on the Start button, choose Programs → MS Office 2000 → Microsoft PowerPoint or choose Programs and then Microsoft PowerPoint (Figure 4.1). Or, if you have the PowerPoint icon on your Desktop, then double click on the icon and the program will open.

Fig. 4.1 Reaching PowerPoint

PowerPoint Options

As you open PowerPoint, a dialog box gives you the choice between creating a new presentation or re-opening an existing presentation (Figure 4.2). To create a new presentation, you have these options:

- **AutoContent Wizard**
- **Design Template**
- **Blank Presentation**
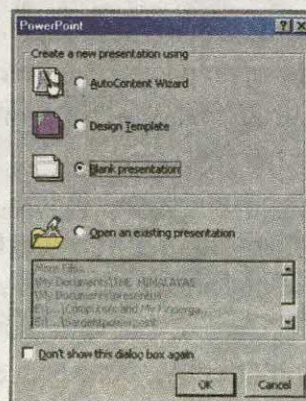
Fig. 4.2 Create a new one or open an existing presentation?

Choosing Auto Content Wizard helps you with the arrangement of the content of your presentation with an automated utility. If you choose Design Template,

you will have the option to choose a basic design suggested by PowerPoint upon which you can build your own presentation. Blank Presentation takes you to a screen where you can create your own presentation the way you like it.

The fourth option is there only if there is an existing presentation that you wish to re-open. In that case, choose the option **Open an existing presentation** and then identify the location and the name of the file that holds the presentation.

Create a New Presentation

At this moment, our choice is Blank Presentation. You can choose this option and then click on the **OK** button. You will get a new screen called the **AutoLayout** window (Figure 4.3). It shows different layouts that you can use while creating PowerPoint slides. The various layouts are easy to understand. The first slide of our presentation, indeed of most presentations, is the title slide. Most users usually choose this layout at the top left corner for their title slides. If you click the mouse button on that layout, a thick border surrounds it and you know you have selected that particular layout. There are many other options in the layout window for slides with different features, like bullets, double column, tables, charts, ClipArt (on your left or right), video, sound and what have you. The kind of layout you choose has to do with the kind of layout your presentation needs. Make sure **Formatting** and Standard Toolbars are checked in the **View** menu.
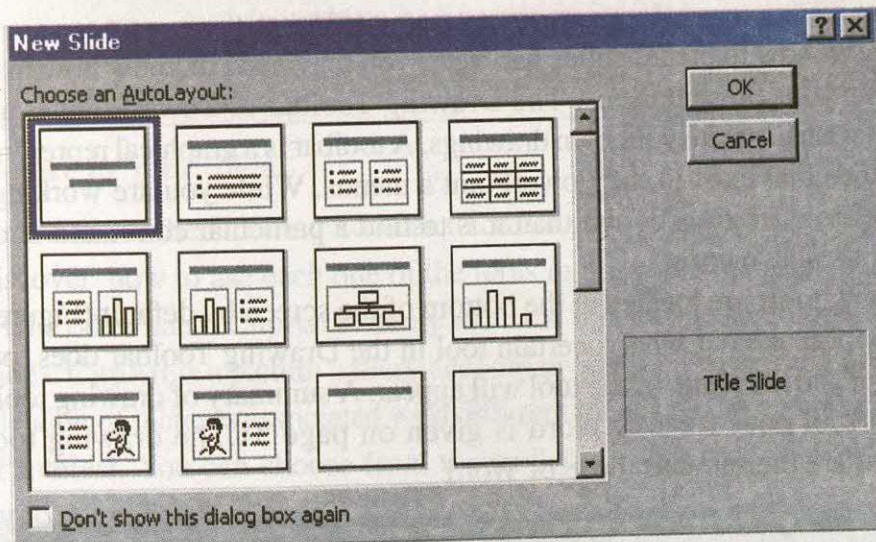
Fig. 4.3 The AutoLayout window

Adding text to the slide

Your first slide is the title slide. And you have decided to make your slides, say, on Measurement. When you choose the layout for the title slide, you get the screen similar to Figure 4.4. You type in the title and you get the screen as in Figure 4.5.
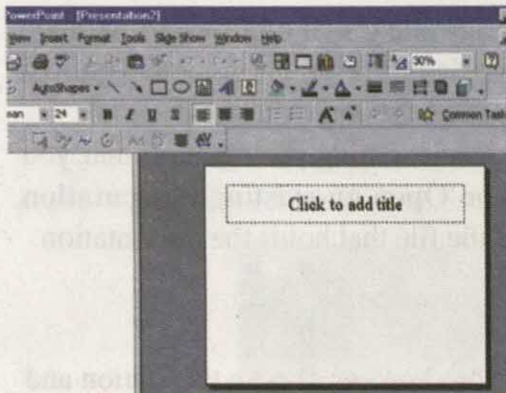
Fig. 4.4 The title slide
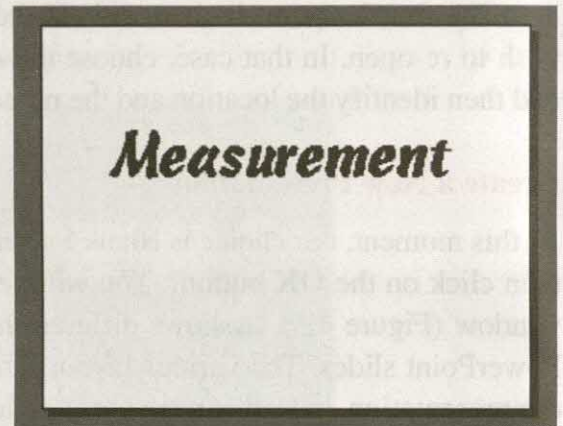
Fig. 4.5 The title

The Next Slide

To add a new slide, select **New Slide** in the Insert menu. You get the AutoLayout window again. Make your choice on the kind of slide you are going to create next.

Drawing Tools

Having learnt how to create slides with text, you may need to know how to create pictures for your presentations. The Drawing Toolbar of PowerPoint is a great help if you wish to create your own drawings. A toolbar is a graphical representation of commands that exist in the PowerPoint's menus. While you are working, it is often easier to click on a button than it is to find a particular command in one of PowerPoint's nine menus.

Drawing tools are located at the bottom of the screen by default (Figure 4.6). If you cannot make out what a certain tool in the Drawing Toolbar does, put the pointer on it and the name of the tool will appear. A summary of drawing tools and what each tool does for MS Word is given on page 31. The drawing tools of PowerPoint are the same as those of Word.

Fig. 4.6 The Drawing Toolbar of PowerPoint

Other Toolbars

Apart from the Drawing Toolbar, PowerPoint has a number of other toolbars that you can use to streamline your work (Table 1). For example, when adding special effects to objects, you may want to display the **Animation Effects** Toolbar.

TABLE 1
Toolbars

Toolbar	Description
Standard	Includes tools for working with files and cutting, copying, pasting and undoing operations.
Formatting	It controls tools, font alignment, spacing, colour, etc.
Animation Effects	It allows to include multimedia effects on selected slides
Clipboard	Shows the contents of items you have placed there in cut and copy operations.
Drawing	Contains commands for working with text used as a graphic element (i.e., logos, oversized first letters, etc.) and drawing shapes with various colours and fill patterns.
Outlining	It displays buttons that enable you to rearrange the levels of text in your presentation.
Picture	Gives you a variety of options for importing and then editing images in PowerPoint.
Reviewing	This is a palette of seven tools you can use when you are reviewing a presentation: five for Comments, one for Outlook tasks and one for sending Mail.
Tables and Borders	Displays various tools for creating and modifying tables.
Web	Offers you standard browser buttons (like forward and back), the URL textbox and more.
WordArt	Displays a toolbar with the tool for creating WordArt and various tools for editing it.

Add Picture to Your Slide

If you want to use the Drawing Toolbar to create your own illustrations, you will soon discover how to use each one of the tools in this toolbar.

On the other hand, ClipArt is likely to be the other most common addition to your slides. ClipArt is a picture gallery accompanying the PowerPoint program. It is a collection of pictures associated with different ideas in a large number of areas of your interest. You can choose from this collection and use the picture that is relevant to your slide.

You can choose from three ways to insert ClipArt into your slide. One, reach the AutoLayout window and choose either the first or the second layout in the third row from top (Figure 4.3). You will get a screen with three divisions: one, to add title; two, to add text and three, to double click to add ClipArt. When you double click for the ClipArt, you will reach the Clip Gallery. You make your choice of the broad area and then within that area, choose the picture that suits your purpose.

The other way to insert ClipArt is clicking on the **Insert ClipArt** tool on the Drawing Toolbar. You will reach the **Clip Gallery**. Select a category, such as **Academic**. Click **Keep Looking** for suitable graphics. To insert a graphic into your slide, click on the graphic and then click Insert Clip. Move the graphic by dragging it to the desired location. You can right click on a graphic and get the option to add the clip to your presentation.

The third way is through the Insert menu. Choose Picture and then ClipArt. You will reach the same picture gallery (Figures. 4.7, 4.8 and 4.9).
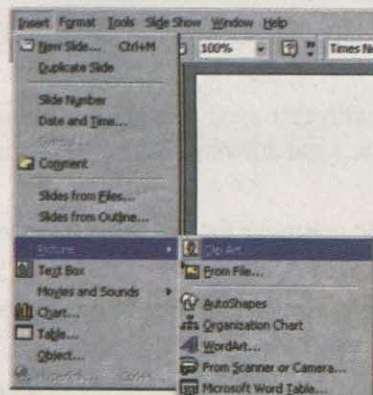
Fig. 4.7 Reaching ClipArt through the Insert menu

Fig. 4.8 Insert ClipArt window
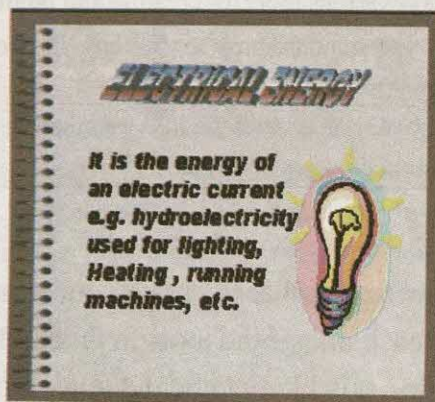
Fig. 4.9 The glowing bulb has come from the clip gallery

Proof-read, Edit and Collaborate

When you have created a presentation, it is important that you proof-read and edit it to make sure it is error-free. This is especially important for collaborative projects that you develop with your friends.

Check Consistency and Style

By default, PowerPoint automatically checks the presentation for consistency and style and marks problems on a slide with a light bulb. You can fix or ignore these

errors and also change the elements that PowerPoint checks for. The light bulb is not available if you have turned off the **Office Assistant**. To turn on the Assistant, click Show the Office Assistant on the **Help** menu. Then :

- open the presentation you want to check for style and consistency
- click the light bulb and then click the option you want in the list.

Insert Comments

- On the Insert menu, click **Comment** (Figure 4.10) type *Remember to update this slide*. PowerPoint automatically adds your user name to indicate that you wrote the note.
- To move the comment, move the pointer over it. When the double-headed arrow appears, click and drag the comment to where you want to move it (Figure 4.11).
- To turn off Comments, click Comments on the View menu.
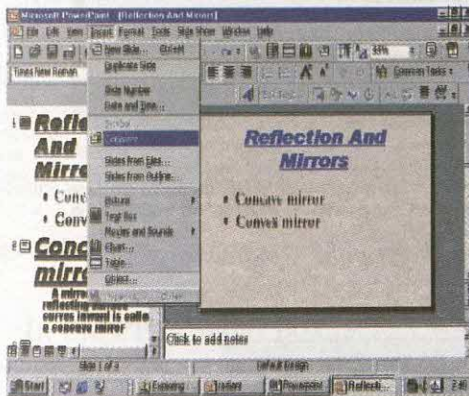
Fig. 4.10 *The comment option*
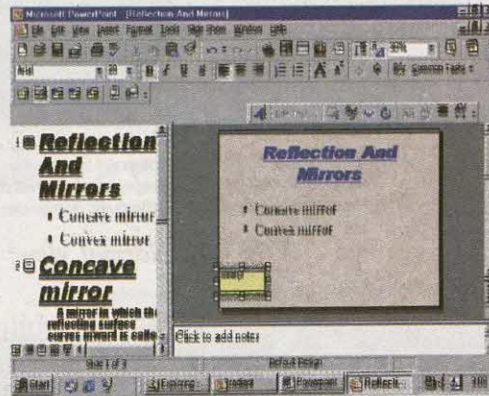
Fig. 4.11 *Inserting a comment*

You can also click **Show/Hide comments** on the **Reviewing** Toolbar.

Save Slides

It's time now to save your work. Go to the File menu, choose **Save** option. You will be taken to the **Save As** dialog box. Name your file and save it where you want, e.g. in the My Document folder or on the floppy disk.

View Presentation

There are three ways to view your presentations in PowerPoint. The views are accessed from the View menu, or from the buttons in the lower-left corner of the PowerPoint screen.

- **Normal** view: when you are designing a presentation slide by slide. In Normal view, the left pane is the **Outline** pane, the **Slide** pane is the upper-right and the **Notes** pane is in the lower-right areas of the screen respectively. The Normal

You can set the default file location when you save a file. to do this, go to Tools →
Option →Save and indicate the path.

view makes it easy to organise a presentation in outline format and add notes to each slide, as you can see in Figure 4.12.

The PowerPoint Normal view allows you to view your presentation outline, slides and notes. With this view you are able to organise your presentation and add content to slides.
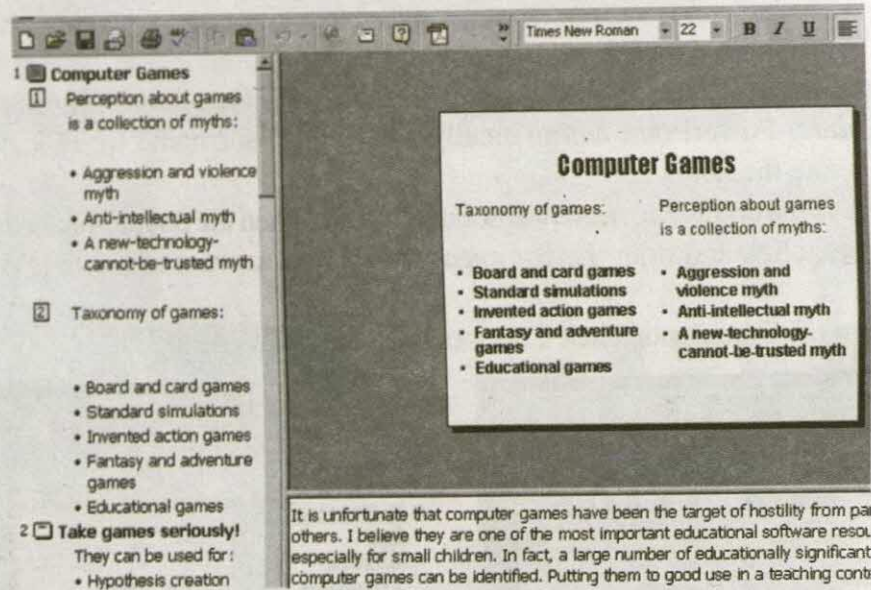
Fig. 4.12 Normal view; note the tripane window
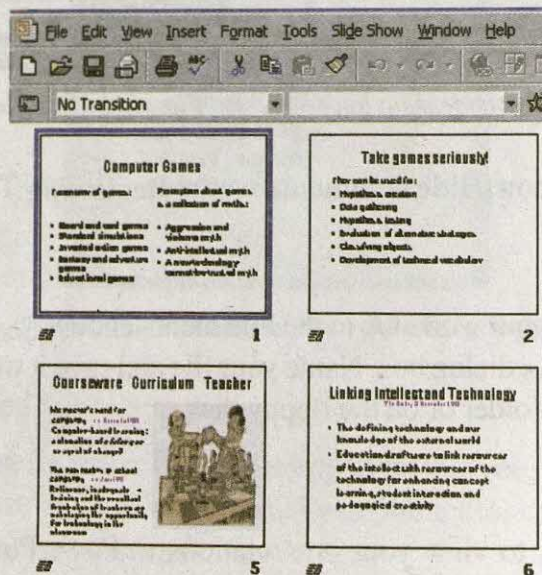
Fig. 4.13 Slide Sorter view, showing some of the slides in the file

- **Slide Sorter** view shows the entire set of slides on the screen, so that you can check and change the order and consistency of the slides. Slides can be copied and moved (Figure 4.13).

- **Slide Show** view puts the presentation together as a slide show, so you can view the finished presentation, complete with sound and animation and active hyperlink.

Print Presentations

PowerPoint lets you print the whole presentation or just selected slides. It also lets you choose what slide contents to print. Follow these steps to print your presentation.

If you are printing handouts, you can specify how many slides are to be included on a page. And if you want, you can print just the speaker's notes or your presentation outline.

Click the File menu, and then click Print as it has been shown in Figure 4.14. Your choice of Print will open a dialog box. To print all the slides in your presentation click **All**.

Fig. 4.14 Printing PowerPoint slides

In the **Print what** box, select what slide contents you want to print (Figure 4.15). In the **Number of copies** box, enter the number of copies you want. Click OK to print the presentation.
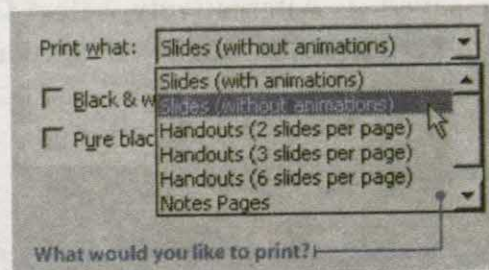
Fig. 4.15 Print what?
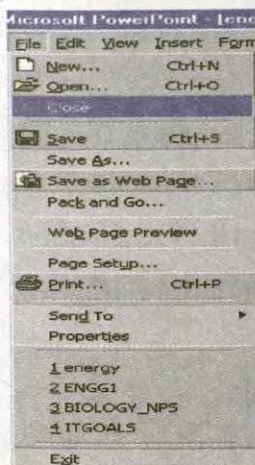
Close Presentation

To close your work with PowerPoint, after you have saved your file, click on the File menu and select **Close** option (Figure 4.16).

Fig. 4.16 Closing a file
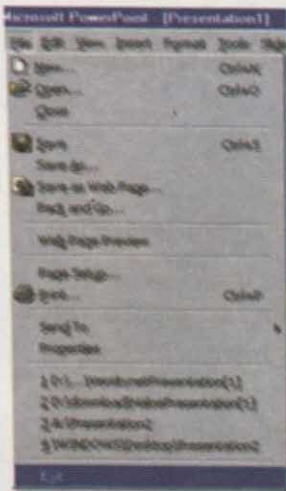
Exit PowerPoint

To exit PowerPoint, click on File menu, select the option **Exit** as shown in Figure 4.17. If you are closing the Power-Point program without saving your presentation, a dialog box will appear. Choose Yes to save the presentation or click Save and then exit the program.

Fig. 4.17 Exit PowerPoint

Open an Existing Presentation

If you want to modify a presentation or add to it or delete from it, you have to open the file that already exists. To re-open the file, go to the File menu and select the option Open (Figure 4.18). Locate the file where you saved it. Alternatively, select **Open an existing presentation** in the PowerPoint dialog box. Locate the presentation and press OK.
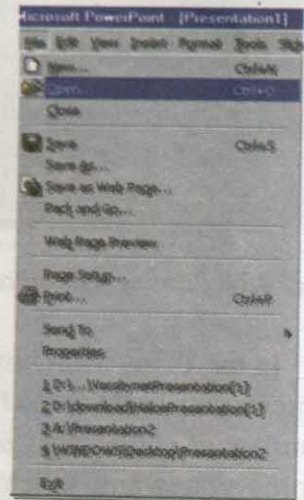
Fig. 4.18 Re-opening a file

Add Notes

You have seen notes written on the Notes pane added to a presentation (Figure 4.12). To add notes to a slide:

- use the scroll bar in the Slide pane to move to the first slide in the presentation
- click the icon Outline view, which is present at the left bottom corner of PowerPoint window
- click on the Notes pane
- type in your note
- continue to add notes to each slide by selecting the slide with the scroll bar,

clicking in the Notes pane and then typing the notes.

Customise a Presentation

PowerPoint offers you many choices of colours, backgrounds, styles, fonts, formats, bullets, headers and footers. Using PowerPoint, you can create slides for different types of presentations, handouts and lectures.

In addition to the presentation styles that are part of PowerPoint, you can use styles of your creation easily and quickly. You may want to incorporate pictures, ClipArt or other graphics.

Choose a Design

Choose **Apply Design Template** on the Format menu. Click on any one out of the list of designs that PowerPoint has. With every choice, the preview is available for the user to have some idea of the design as the background for his slide. When you like a design, just click on **Apply** (Figure 4.19). Alternatively, you can double-click on your choice and it will automatically apply itself.

Fig. 4.19 Choosing a design for the background

To remove background design from your sildes, choose Background on Format menu, check Omit background graphics from master. If you want to remove the background colour, click on the white colour box.

Customise the Background

Depending on how you use a presentation, a change in the background may make it easier to see and read the information. Customising the background allows you to change the background colour of every slide. As a rule, it is best to use a colour that matches the lighting in the room in which you are presenting. Dark blue is excellent for showing a presentation in a darkened room, while a lighter background is better for a lighted room.

To change the background colour for slides:

- On the Format menu, click **Background**
- In the Background dialog box, click the down arrow. You will see several colour boxes, options for **More Colors** and **Fill Effects** as shown in Figure 4.20

If you are creating presentation to be used as transparencies for an overhead projector, or are planning to generate printed handouts, use lighter background.

Fig. 4.20 Choosing the Fill Effects

- Click Fill Effects to browse through the available effects
- Click OK or Cancel
- In the Background dialog box, click the down arrow again
- Click More Colors to see the variety of colours available
- Click the Custom tab to select any colour in the colour spectrum
- Click OK or Cancel
- Click Apply to All to make any changes apply to the entire presentation.

Use a Picture as Background

To use a picture as the background
- Select Picture option from Fill Effects
- Click on the button Select Picture, then select the location of the image file from where the picture would come
- Click the button Insert (Figures 4.21- 4.23).
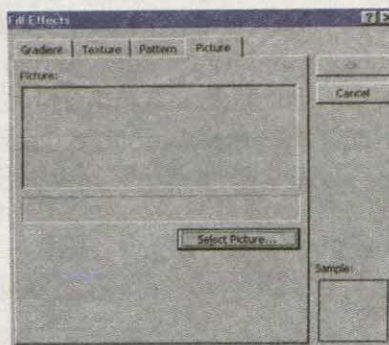
Fig. 4.21 *Select Picture option*
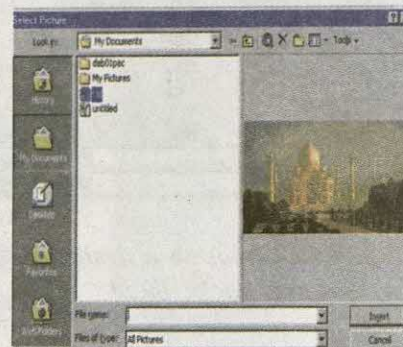
Fig. 4.22 *Locate the picture*
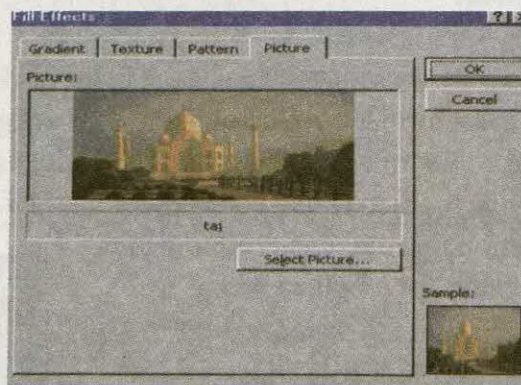
Fig. 4.23 *Insert the picture*

Select Colours and Fonts

Changing the colour scheme is more dramatic than changing the background colour. Completing the colour selection is the next step in customising a presentation. There are two ways to change colours: use a preset colour scheme or customise

your own colour scheme. You can make changes to almost all parts of a presentation including the notes and handouts.

Change the Colour Scheme for All Slides

If you wish to change the colour scheme for all your slides:

- Click Slide Color schemes on the Format menu as shown in Figure 4.24
- Click the first Color schemes in the first row (Figure 4.25)
- Click Apply to All to make the change to the entire presentation. This darker colour scheme is especially effective for use in a darkened room.
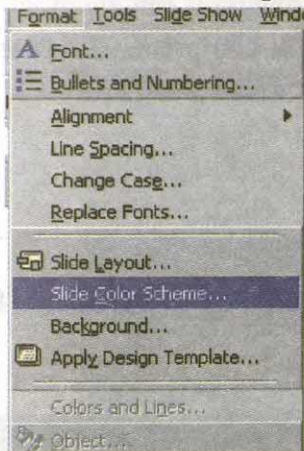
Fig. 4.24 *Selecting slide color scheme*
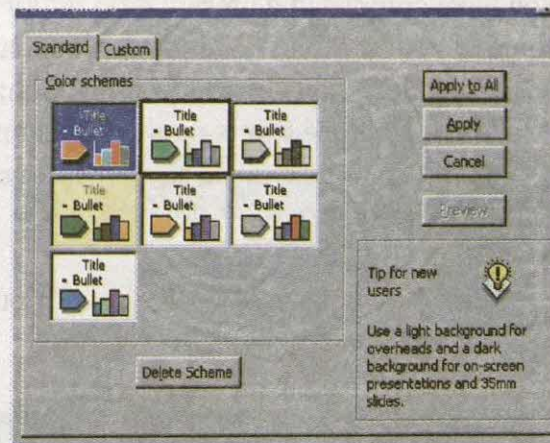
Fig. 4.25 *Background colors*

For slide show, a darker background gives richness and depth.

Customise the Colour Scheme

To customise the colour scheme, click Slide Color Scheme on the Format menu, then:

- Click the Custom tab. The Background color scheme box is selected as shown in Figure 4.26.
- Click Change Color. The current colour is selected on the hexagon as shown in Figure 4.27.
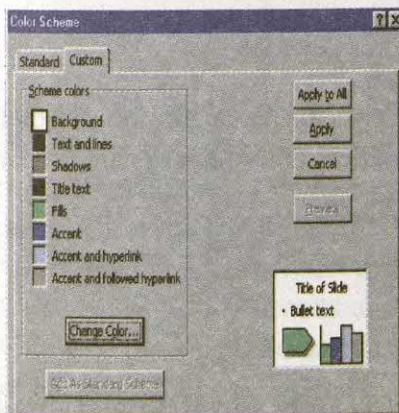
Fig. 4.26 *The custom colours*
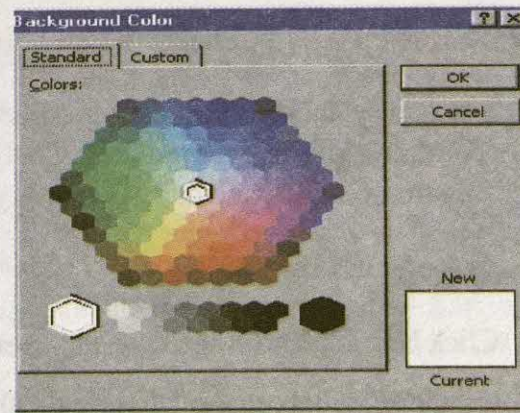
Fig. 4.27 *Changing colour*

- Click a different spot at the top of the hexagon, and then click OK. You can see a comparison between the old colour and the new colour in the bottom-right corner of the window
- Change the rest of the options under **Scheme colors** as desired
- Click Apply to All to make the colour changes to the entire document.

Replace Fonts in a Presentation

The second step in customising a presentation is to select appropriate fonts. Whether you have completed a presentation or are working on one, you can easily change some or all of the fonts. With PowerPoint, it is easy to make comprehensive changes.

To replace fonts in your presentation:
- Click **Replace Fonts** on the Format menu (Figure 4.28)
- In the **With** box, click, say, on **Tahoma** (Figure 4.29)
- Click Replace
- Click Close
- You may repeat the process until you have selected the most effective fonts for your presentation.

Fig. 4.28 Select Replace Fonts   *Fig. 4.29 Replacing the current font*
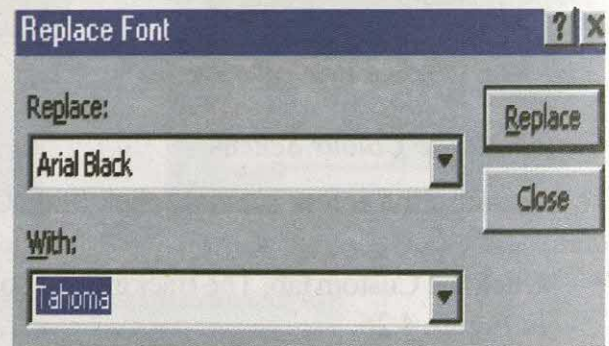
Create Header and Footer in a Presentation

To create presentations, you may go through several drafts or be one of several other children working on a presentation. Using headers and footers is an easy way to ensure that versions and authors do not get mixed up.

To add footer information:

- Click **Header and Footer** on the View menu (Figure 4.30)

- On the Slide tab, under **Include on slide**, select **Date and time** and **Update automatically**, if you want the date to reflect the last date the slides were modified.

You can also do one of the following:

(i) Select a date format from the date list, or
(ii) Select **Fixed** and type the date you will be giving the presentation
so that it reflects when the presentation is given instead of
when it was updated.

- Select **Slide number** to print a number on each slide
- Select Footer and then type the preferred text in the text box
- Select **Don't show on title slide**. This shows the footer you have created on
all subsequent slides, but leaves the footer off the title slide
- Click Apply to All to make these changes throughout the presentation.
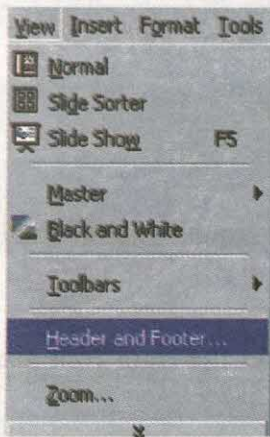
Fig. 4.30 *Selecting header and footer*
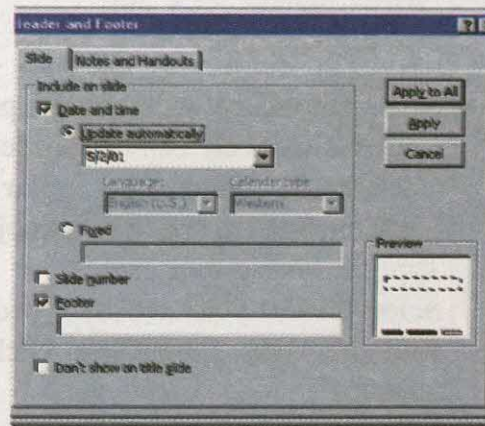
Fig. 4.31 *Inserting header and footer*

Add Graphics to Your Presentation

Adding graphics helps create eye-catching slides for a presentation. You have already learnt how to insert readily available graphics from the ClipArt gallery. There are many other possibilities. PowerPoint gives you the options of adding **AutoShapes**, WordArt and flowchart symbols. You can also import text, graphics and charts from other Microsoft Office programs.

Using AutoShapes to add Standard Objects

PowerPoint has many standard objects that can be added to presentations, including objects with and without text. With some AutoShapes, you can add text and with others you can create a flowchart.

To add an AutoShape to a presentation:

- Click Picture on the Insert menu and then click AutoShapes
- Click **Stars and Banners** and then click the horizontal bar (Figure 4.32)
- Click at the upper-left corner of the slide and then drag the object down diagonally about one inch
- To delete an AutoShape, right-click the AutoShape you want to delete and then click on **Cut**.
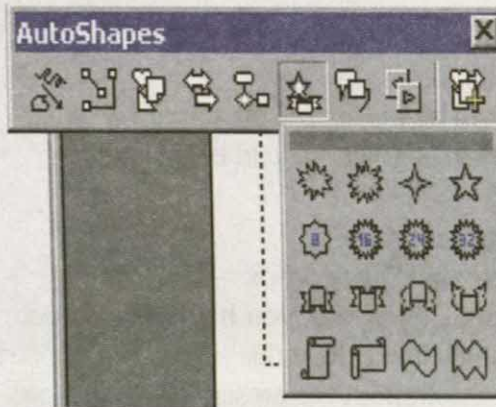
Fig. 4.32 AutoShapes
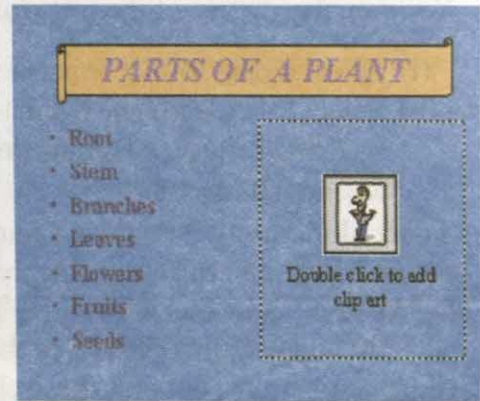
Fig. 4.33 Banner for the title

Once you draw a shape in PowerPoint, you can enter text inside it by clicking the Text tool and then clicking the Shape and typing the text. You can even rotate the object using the Free Rotate tool and the text stays put inside.

To add an AutoShape with text to a presentation:

- Click **Callouts** on the AutoShapes toolbar
- Click the **Rounded Rectangular Callout**
- Click on the slide and drag the object down diagonally about one inch
- Type the text of your choice
- Select the text you have just typed
- Right-click the Callout box, click **Font**, select the right font size and then click **OK**
- Click and drag the upper-right corner of the Callout box until all the text fits within it
- Close the AutoShapes toolbar.

Use WordArt to Add Creative Text

PowerPoint WordArt lets you take plain text and add some excitement to presentations. With 30 styles of WordArt to select from, it is simple to make your text stand out. WordArt is easy to use and it allows you to use the Formatting Toolbar to change the appearance of the text. WordArt has many uses, especially when combined with other graphics. You can add banners, seals and logos that contain dynamic WordArt effects.

To Use WordArt:

- On the Insert menu, click Picture and then click WordArt (Figure 4.34)
- Double-click a style or choose a style and click OK (Figure 4.35)
- Type the text you want in the WordArt
- In the Font box, click a font (Figure 4.36)
- In the **Size** box, click, say 36.
- Click OK. The WordArt appears on the slide (Figure 4.37)
- Drag the WordArt to a location on the slide that you prefer
- Close the WordArt Toolbar.
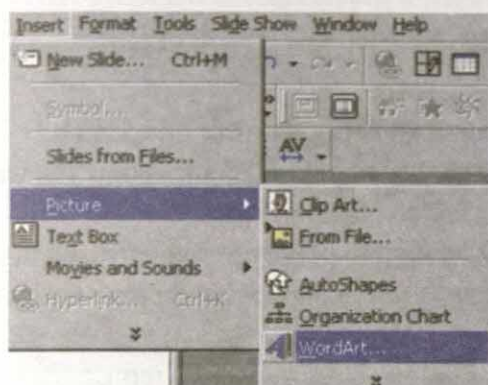
Fig. 4.34 *Reaching WordArt*

Fig. 4.35 *WordArt variety*

Fig. 4.36 *Selecting font and size*
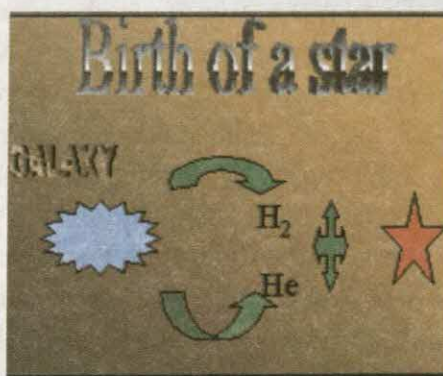
Fig. 4.37 *The new text*

Add Multimedia Content

Adding multimedia content such as video and sound makes your presentation more lively. At the same time, multimedia content can often communicate more information than a slide with only text does.

Sound, music, video and animated pictures are available in the Clip Gallery. You can insert music, sound, or a video clip into a slide show. You can have the clip play automatically when you move to the slide or have the clip play only when you click its icon during a slide show.

You need speakers and a sound card with the computer to play music and sounds. To find out what is installed in the computer and what settings are in use, you can check both the Multimedia and Sounds categories in Windows Control Panel.

Insert Music or Sound on a Slide

To add sound to your slide:

- Point to **Movies and Sounds** on the Insert menu

- Do one of the following:
  (i) To insert sound from the Clip Gallery, click Sound from Gallery and then locate and insert the sound you want
  (ii) To insert sound from another location, click Sound from File, locate the folder that contains the sound and then double-click the sound you want. A sound icon 🔊 appears on the slide.
- A message is displayed. If you want the sound to play automatically when you go to the slide, click Yes. If you want the sound to play only when you click the sound icon during a slide show, click No
- To preview the sound in Normal view, double-click the sound icon.

Insert a CD Audio Track on a Slide

- Display the slide to which you want to add a CD audio track
- On the Insert menu, point to Movies and Sounds and then click **Play CD Audio Track** as shown in Figure 4.38
- Select the track and timing options you want and then click OK (Figure 4.39). A CD icon 💿 appears on the slide
- A message is displayed. If you want the CD to play automatically when you move to the slide, click Yes. If you want the CD to play only when you click the CD icon during a slide show, click No
- To preview the music in Normal view, double-click the CD icon.

Fig. 4.38 *Inserting CD audio track*
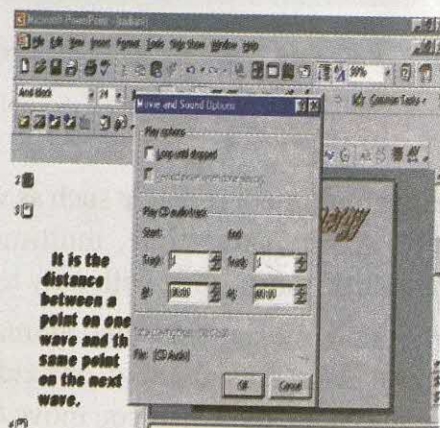
Fig. 4.39 *Play CD audio track*

Insert Video on a Slide

Display the slide you want to add the video to. Then:

- On the Insert menu, point to Movies and Sounds.
- Do one of the following:
  (i) To insert a video from the Clip Gallery, click **Movie from Gallery** and then locate and insert the video you want as shown in Figure 4.40

(ii) To insert a video from another location, click Movie from File, locate the folder that contains the video and then double-click the video you want (Figure 4.41)

- A message is displayed. If you want the movie to play automatically when you move to the slide, click Yes. If you want the movie to play only when you click the movie during a slide show, click No

- To preview the movie in Normal view, double-click the movie.
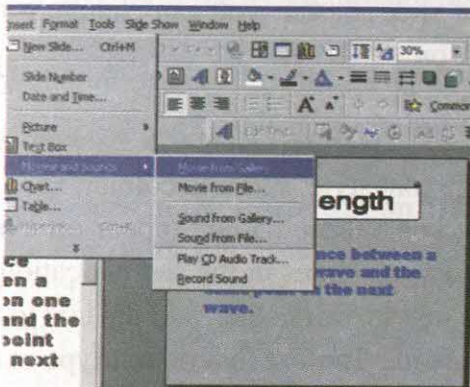
Fig. 4.40 *Inserting movies from gallery*
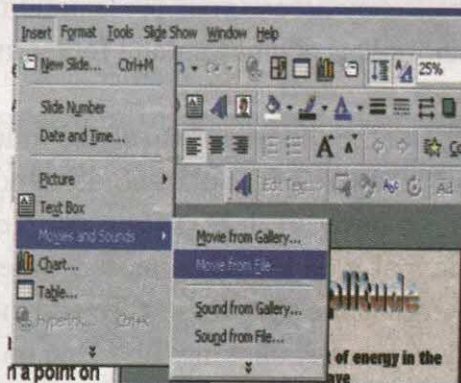
Fig. 4.41 *Inserting movies from file*

Import an Excel Chart

The spreadsheet program Excel is very useful in representing data in different graphical forms. The bar diagram shown in Figure 4.42 is graphical representation of the average weekly day temperature in four major cities of the country during June 2001. In order to display such graphical representations of data, select (while you are in Excel) the chart you want to import into PowerPoint. Then:

- On the Edit menu, click Copy
- Open your Power Point file
- Place the cursor on the slide where you want to insert the chart
- On the Edit menu, click Paste.

The average maximum temperature (degree Celsius) in 1, 2, 3 and 4 weeks of June 2001

- Kolkata
- Mumbai
- New Delhi
- Chennai
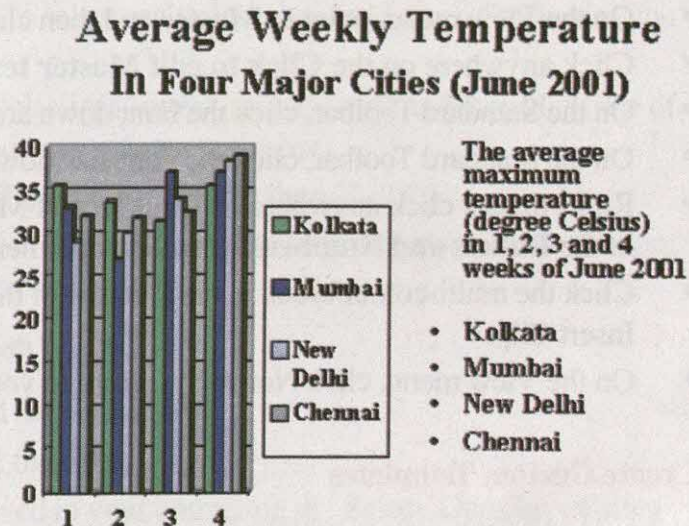
Fig. 4.42 *A bar diagram from Excel. You can import it to PowerPoint slide like any other graphics*

Master Slides and Custom Templates

If you use PowerPoint on a regular basis for presenting related materials, you may want to use master slides and create a custom template. With the master slides and custom template, all your presentations will have a consistent look and feel, and you won't have to customise each presentation layout separately.

The slide master allows you to customise the look of each slide and ensure consistency across your presentation. In the slide master, you can change fonts, insert bullets and header and footer information.

Use the slide master to do the following: add a picture; change the background; adjust the size of the placeholders and change font style, size and colour.

To have art or text for example, a logo or a topic name appear on every slide, put it on the slide master. Objects appear on slides in the same location as they do on the slide master. To add the same text to every slide, add the text to the slide master by clicking **Text Box** on the Drawing Toolbar (but do not type in the text placeholders). The slide master does not control the look of the text you have added with Text Box.

Change Master Text and Title Styles

The date, footer and number areas can all be changed in the same way. Experiment to see which combinations you like best. Remember that the slide master changes every slide in your presentation. Try the following:

- On the View menu, point to **Master** and then click **Slide Master**
- Click anywhere on the **Click to edit Master text styles** text block
- On the Standard Toolbar, click the Font down arrow and then click **Arial**
- On the Standard Toolbar, click the Font size down arrow and then click 40
- Right-mouse click anywhere on Click to edit Master text styles, click **Bullet** in the **Bullets and Numbering** list box and then click Pictures
- Click the multi-colour block in the first row of the third column and then click Insert Clip
- On the View menu, click Normal to return to your presentation.

Create Custom Templates

You have already used one of the design templates that come with PowerPoint. If at any time you select a style that you do not want to use for your presentation, you can quickly change to another style. Or you can try several different styles to find one that fits your presentation.

To create a design template of your own:

- Open an existing presentation or use a design template to create a presentation as the basis for your new design template
- On the View menu, point to Master and then click Slide Master
- Change the slide to suit your needs. The changes apply to all slides in the presentation
- To save the slide as a template for future presentations, click **Save As** on the File menu
- In the File name box, type a name for your design template
- In the Save as type box, click **Design Template**. You can save your new design template in one of your own folders or you can save it with the other design templates in the **Presentation Designs** folder.

If none of the templates suits your needs or you want to create a presentation with a unique appearance, start with a blank presentation and follow the steps for designing a template. To open a blank presentation, click New on the File menu.

Custom Shows

Occasionally, you may want to use only part of a presentation for a group of people. To do this, you can use the Custom Shows feature instead of creating a whole new presentation.

To create custom shows:

- On the Slide Show menu, click **Custom Shows** and then click **New**.
- Under Slides in presentation, select a slide you want to include in the custom show and then click Add. To select multiple slides, hold down Ctrl key as you click the slides.
- To change the order in which slides appear, select a slide and then click one of the arrows to move the slide up or down in the list.
- Type a name in the **Slide show name** box and then click OK.
- To see a preview of a custom show, select the name of the show in the Custom Shows dialog box and then click Show.

Open an Existing Presentation

To open a presentation you had earlier created:

- Click on File menu, select the option Open
- Locate the file that was saved in your computer, or Select Open an existing presentation from PowerPoint dialog box; it will appear the first time you open PowerPoint
- Locate the presentation
- Press OK button.

Save a Presentation after Modifications

After you have modified a slide, you can save it with the modifications in the following way:

- Click the option Save in the File menu (Figure 4.43)
- Type the new name for the presentation (if at all you want to change it) in the File Name dialog box
- Press the Save Button.
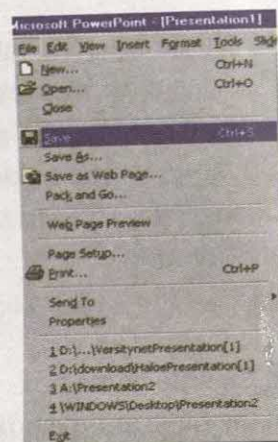
Fig. 4.43 Save a file again

Delete a Slide

Occasionally you may want to delete a slide from your presentation. To do that:

- Select the slide which is to be deleted
- Click Delete on Edit menu.

Exercise

1. Prepare a presentation on *Measurement* jointly with two other friends. Your presentation should indicate how you measure length, area, volume, mass, time and temperature. Indicate the unit of measurement in each case (SI Units). Illustrate with available ClipArt pictures and your own drawings. Save your file. Take out hard copies of your slides.

2. Prepare a presentation on Computers

   The presentation should include the following slides.

   (i) A title slide. Use WordArt for title

   (ii) A picture of a computer with the various components labelled

   (iii) A block diagram of the input, processing and output path using AutoShapes.

   Use appropriate design templates, auto layouts and slide colour schemes from Format menu to make the presentation attractive.

3. Prepare a presentation on 'Trees'

   Draw various parts of a tree, viz. root, stem, leaf, flower, fruit on separate slides

   Draw a complete tree using Paint and insert this on a slide.

   Use text boxes on each slide to give brief descriptions of the parts

   Use bulleted description on at least one slide

   Use View/Slide Sorter to rearrange the slides

4. Prepare a presentation on Animals

   Add sound clips using Insert menu

   Use Preset Animations and Slide Transitions from Slide Show menu in the presentation.

   Create Custom Show using Slide Show menu with a few selected slides.

Note for the Teacher

I.   Like all other tool uses, the use of software tools should precede a clear understanding of why we intend to use a tool. In the context of PowerPoint, the most important question is: What is it that the child wishes to communicate? What is it that she wants to present? And who is her audience? These questions are independent of the medium that the child chooses to present her ideas. Only when one has the answer to these questions, should the tool enter into consideration.

In the use of PowerPoint, economy of words is important. Children should develop the ability to display the minimum amount of information and yet achieve their purpose. Using more graphics than text and keeping graphics simple are useful practices. If what is to be presented *is* complex, either due to the graphics or too many lines of text, one useful practice is to make the visual elements appear bit by bit, as the presenter wishes. This makes a complicated screen simple.

Colour and graphics are weighty with meaning. Colours in good contrast are effective. Elements of a display which appear in the same colour, suggest relatedness. Therefore, consistency with the use of colours is important.

To the extent possible, children should create graphics on their own, rather than borrowing images from the ClipArt gallery. True, the gallery has excellent images, but they clip off the child's imagination and do not necessarily convey what *he* has in his mind.

The text is by far the most important consideration. The text that scrolls and scrambles or appears with the sound of gunshots do not impress anyone. Word groups like *at all*, *of course*, *in case* and *to imagine* should appear on the screen together without a line break. Finally, hyphenation does not look good in a PowerPoint presentation!

II. PowerPoint 2000 (Part of MS Office 2000) offers several new features designed to help children collaborate and share information through the Web and to create eye-catching presentations. This version of PowerPoint is also easier to use than earlier versions. There is no single manual available in the market that would focus on all the features of the tool. It is important that we explore the program and discover for ourselves what we can do with it in *our* work-related situations.
Some of its interesting features are:

Tri-pane view   PowerPoint combines slides, outlines and notes into one view. This makes it easy to perform many actions, including adding new slides, editing text, entering notes and navigating while editing.

AutoFit and Fit to Window   In PowerPoint, text is automatically resized to fit into a placeholder so that it doesn't "fall off" the slide. Slides automatically resize to fit the display resolution and window, so the user no longer has to manually adjust his slides or screen resolution.

Native tables   One can create tables directly in PowerPoint instead of importing from Word or Excel. PowerPoint tables are composed of Office Art shapes and behave like tables in Word, making them easy to edit and consistent with styles and themes.

Flexible handouts   There are now more options for audience handouts.

PowerPoint Central   One can get support from helpful PowerPoint resources, such as tutorials, additional textures, sounds and animations in the Office Value Pack and the PowerPoint Web Site.

Custom shows One can create mini-presentations within a single PowerPoint file for different audiences.

Slide show menu The new slide show menu consolidates everything one needs to deliver presentations electronically, whether in a kiosk, in a conference room, or over the Internet.

Types of output PowerPoint provides you with every output option: slides, black-and-white and colour overheads, black-and-white and colour handouts, speaker's notes and on-screen electronic presentations. In addition, PowerPoint now supports virtual presentations over the Internet.

Log on to Logo

Learning Objectives

❑ Distinguishing between Logo primitives and procedures
❑ Locating bugs in a program and debug the latter
❑ Defining recursion; writing procedure using recursive logic
❑ Writing small programs as part of a complex procedure
❑ Writing procedure with variables
❑ Using conditional commands
❑ Manipulating words and lists with Logo commands
❑ Making colour graphics

In your earlier Logo lessons you must have learnt some Logo primitives. They are so called, because they are the original commands. But then you had created some commands and called them procedures.

In Logo you create procedures and give them names. The name of a procedure is recognised by Logo as a command. However, it is a procedure created by you; it is not a part of the Logo language. They are new Logo commands. You can change names of these commands, but you cannot change a primitive.

Now you understand that a program is a set of commands in a computer language, which makes the machine do something. A program is a logical sequence of commands, which the computer "understands". When you are able to write a program, you are actually making the computer do what you want it to do.

Before we do anything new, let us quickly review some of the commands you used earlier.

Moving the Turtle

Here are some commands that make the turtle move or change the direction of its movement. The list also includes some other oft-used commands.

Forward or FD, to move turtle in forward direction.
Backward or BK, to move turtle in backward direction without changing the direction of its face.
Right or RT, to make turtle turn right (in clockwise direction) at a given angle.

Left or **LT** tells the turtle to turn left (anti-clockwise) at a given angle.

Home brings the turtle back to its starting position.

Hideturtle or **HT** hides the turtle or makes it invisible.

Showturtle or **ST** shows the turtle again.

Clearscreen or **CS** clears the screen of any drawings and the turtle returns to the home position.

You also used some pen-control commands. These commands allow movement of the turtle in the draw mode, or one can move it without drawing on the screen:

Penup lifts the turtle pen. Now it no longer draws.

Pendown lowers the turtle pen and turtle can now draw again.

Penerase enables the turtle to erase a line already drawn.

More Commands for the Turtle

Now you shall use more Logo features than you did earlier. So, take a quick look at some more commands. These commands have to do with managing Logo resources, rather than with turtle graphics.

Textscreen (TS)

Textscreen enlarges the Listener window so that you can view greater part of the procedure that you are working on (Figure 5.1).
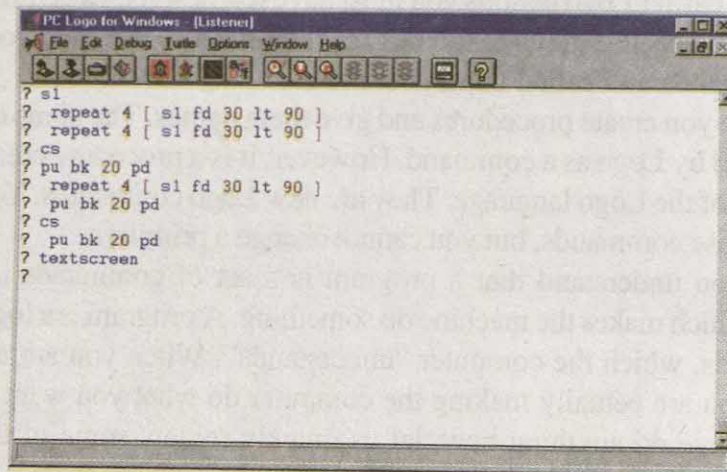
Fig. 5.1 *The screen enlarges following the Textscreen command to make
the screen show longer programs*

Type **TS** and press Enter.

Notice that the prompt is in the top left hand corner of the screen waiting for further commands.

Fullscreen

Fullscreen command makes the whole of the screen available for turtle graphics (Figure 5.2).
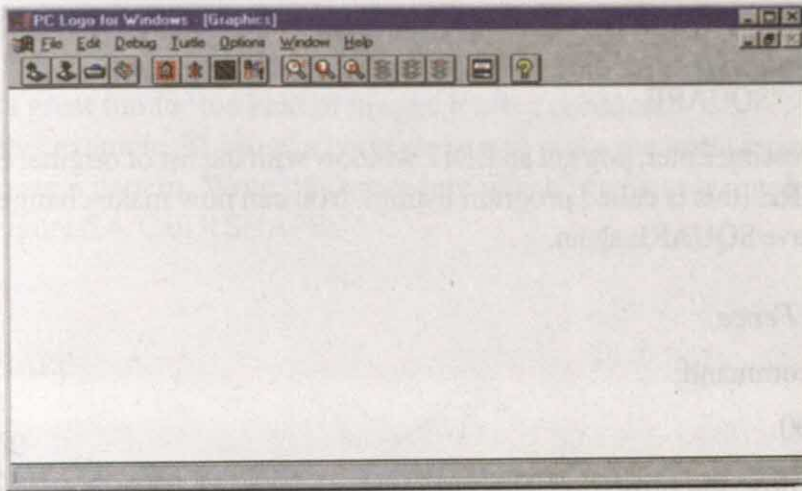
Fig. 5.2 The full screen, following the Fullscreen command

Splitscreen

Splitscreen command splits the screen into two compartments. One of them is the turtle field within which the turtle can operate; the other one below is a four-line text field.

Load

To get back to a procedure you had created earlier, use LOAD command, followed by the name of the procedure. For example,

LOAD "SQUARE

Double quotes followed by the procedure name brings before you the procedure called SQUARE. You can use it again for any number of times. Note again that the name of the procedure is preceded by double inverted commas (").

Pots

Suppose you defined a number of procedures but forgot some of them. You can ask for help by typing the following command:

POTS

A list of all procedures in the memory of the computer will be displayed on the screen.

Edit

Sometimes you may like to make some changes in some of the procedures stored in the memory. The Edit command provides that facility. Let's take an example.

Suppose you want to make a couple of changes in the procedure named SQUARE, type:

> EDIT "SQUARE

On pressing Enter, you get an EDIT window with the list of original commands for SQUARE (this is called program listing). You can now make changes that you want and save SQUARE again.

Wrap and Fence

Type the command:

> FD 300

What dose the turtle do? The turtle moves forward. Then it goes out of the screen and comes back from the opposite side to complete 300 steps. Why? Simple. The screen is smaller than 300 turtle steps. This 'going round the screen' is called wrapping.

We can prevent the turtle from wrapping by making a 'fence' around the screen. The turtle cannot cross this fence. So it will then stay within the boundaries of the screen. The fence can be made by the command FENCE. Type the following command:

> FENCE FD 300

Now the turtle cannot wrap. The screen displays the massage:

ATTEMPT TO MOVE THE TURTLE BEYOND THE FENCE

To allow wrapping again, type:

> WRAP

Recursion

Take a good look at the lemonade bottle. The label of the bottle gives a picture of the bottle. So the picture of the bottle must have a picture of a bottle on its label. Thus the bottle will continue to appear *ad infinitum*.

This interesting phenomenon is called *recursion*.

Fig. 5.3 Bottles ad infinitum

EDIT "NAME lists the procedure you want to alter in the edit mode. Use arrow keys to move the cursor and Delete/Back-space to delete.

DELETE "NAME. lgo delete a Logo file (note the extension).

Recursion implies: Do and continue to do until told to stop.

What does it have to do with Logo? Well, you can write a Logo program, which will 'call itself' again and again, like the lemonade bottle. Writing recursive programs is great fun for the kind of images it often produces.

Take this example. Think of a basic shape and make the turtle repeat it many times to create a pattern. Write this procedure which produces a simple shape as shown in Figure 5.4. Call it SHAPE:

```
TO SHAPE
RT 60
FD 150
RT 135
FD 150
RT 25
END
```
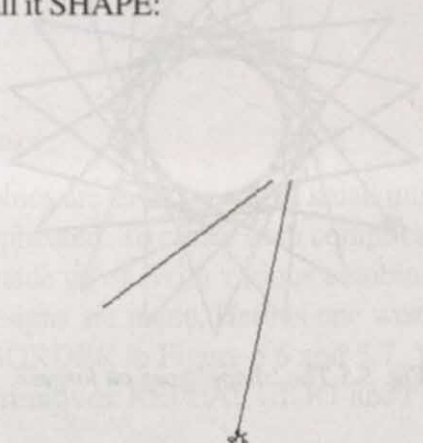
Fig. 5.4 The result of the series of commands above

To have this shape repeated again and again, we could use the REPEAT command. In order to do so, we have to decide how many times to repeat it. But suppose we want it to go on repeating forever. Recursion gives us a way of doing this. We only need to add one more line to this procedure at the very end:

```
TO SHAPE2
RT 60
FD 150
RT 135
FD 150
RT 25
SHAPE2
END
```

See the command SHAPE2 as the last line of the SHAPE2 procedure itself. Now, we have already defined SHAPE2. Then we have just inserted it into SHAPE2 itself. Can you guess what effect would it have?

See what happens when we type in SHAPE2 and get the turtle to execute the procedure. The first eight lines will cause the same shape to be drawn on the screen as they did earlier; we have made no change in these lines. Once the shape has been drawn, the turtle comes to the last line, which is SHAPE2. Because SHAPE2 is a procedure that the turtle now understands, it will go to the top of the SHAPE2

procedure and start executing it from the first line. So we have a situation where the SHAPE2 procedure *calls itself*. It causes the turtle do something and then go back to the top of the procedure and start again.
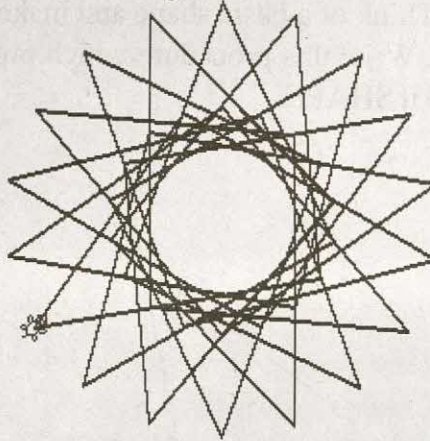
Fig. 5.5 The 'shape' goes on forever

Can you see why the procedure will never stop? END is the command that tells the turtle that the procedure is complete. Here, the turtle never gets to the END command because, in the previous line, we have already sent it back to the beginning again. Each time it comes near the end of the procedure, it goes back to the start again. So it goes on forever (Figure 5.5).

Variables

A variable is that which varies. The syntax for using a variable (SIDE) in the procedure called SQUARE would be:

```
?TO SQUARE:SIDE
>REPEAT 4[FD:SIDE RT 90]
>END
```

Just next to the procedure name, insert a colon, followed by the variable name. There should be no space between the name and the colon.
Then variable name must appear in the title line as well as in the body of procedure. Do not put a blank space between command and the variable name.
To call the above procedure with a variable, follow this example:

Step 1:
Type, after prompt (?)
SQUARE 20
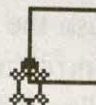
It will draw the square with size 20.

Step 2:
Type, after prompt (?)
SQUARE 40
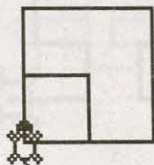
Parts of a Whole Picture

Many complicated graphics are in fact made of small units of simpler designs. Put together, they look complicated. To create such complicated graphics, you need to work out the unit it is made up of. With various combinations and orientations of these units, different designs are made. Here is one worked out example for you. See the picture called BORDER in Figure 5.6 and 5.7. You can create the picture using only a few Logo primitives: REPEAT, LT, RT and FD.

BORDER is a picture of a small unit repeated many times. Can you make out how that unit looks like?

Now, here is the task for you:

Step 1: Your first assignment is to write a procedure (call it TEE) that draws the small unit of the picture, which repeats many times, to form BORDER. Test your procedure to make sure it works.

```
TO TEE
RT 90
FD 15 LT 90
FD 10 LT 90
FD 10 RT 90
FD 10 RT 90
FD 30 RT 90
FD 10 RT 90
FD 10 LT 90
FD 10 LT 90
FD 15
LT 90
END
```

You may think that there is an extra command in the last line, LT 90. Actually, this is not an extra command; it has been included intentionally! You want to have

the turtle start and stop pointing in the same direction, so that each TEE is drawn in the same way. For example, here is a TEE without that last command, LT 90:
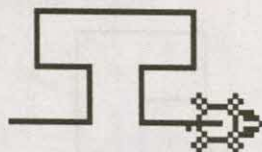
Now if we draw another TEE, the result will be:
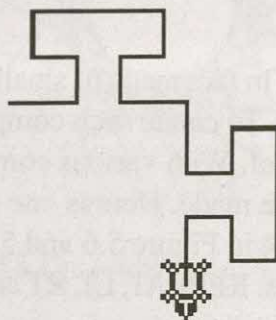
Do you see why? When you tell the turtle to TEE the second time, it points to the bottom of the screen, not to the right! If you repeat TEE, it would go downwards. But, that is not what you want; you want a row of TEEs to form one side of BORDER.

Therefore, you must have the LT 90 command. Now we end the procedure by leaving the turtle pointing in the same direction as when the procedure began. Whenever possible, have your procedures end with the turtle pointing in the same direction as when the procedure began. It makes things easy.

Step 2: Edit your procedure to add the last LT 90 command (if you had not done so before). Now, have the turtle draw 2 TEEs.

Step 3: Write a procedure called TEE1 that draws six TEEs:

```
TO TEE1
REPEAT 6[TEE]
END
```

Now you have the top of BORDER. You can just move the turtle to anywhere you want, then type TEE1 and it will begin drawing from where it is!
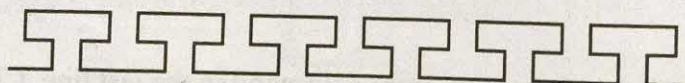
Fig. 5.6 The top of BORDER

Step 4: Now that we have one side of BORDER, the top, you should be able to write down the entire procedure as it looks in Figure 5.7.
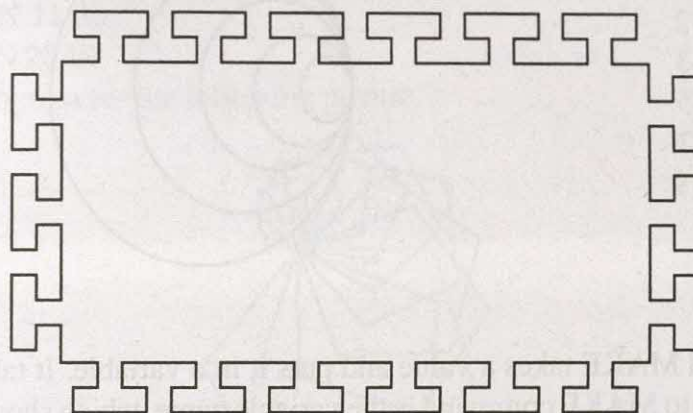
Fig. 5.7 The BORDER

Procedures with Variables

We wrote a procedure called SQUARE. The side of the square was a variable. Try some more programs with variables.

You must have drawn circles during your earlier encounter with Logo. Surely you can write a procedure to draw a circle, which should be quite simple:

```
TO CIRCLE
REPEAT 60[FD 2 RT 6]
END
```

A circle it will certainly be. But what about the size of the circle? There is no scope for indicating the length of the radius. In such cases, Logo assumes a value for the radius, which is called the default value, of 25 units. So the circle you'll get through your above procedure will have a diameter of 50 units.

But the value for the radius can be changed. Let's see how we can have a radius of a different length. Write a fresh procedure for CIRCLE:

```
TO CIRCLE:SCALE
REPEAT 60[FD:SCALE  RT 6]
END
```

The above procedure will produce nothing, because, when you wrote SCALE, you meant that you were likely to change the length of the radius. Remember SIDE in SQUARE?

To get circles of different radii, we must put different values for the variable SCALE (which represents the length of the radius).

Now try:

```
TO SHAPE
HT
CIRCLE 2
CIRCLE 3
CIRCLE 5
CIRCLE 7
CIRCLE 9
END
```

Make

*MAKE assigns
a value to a
variable and
'makes' the
turtle
remember it.*
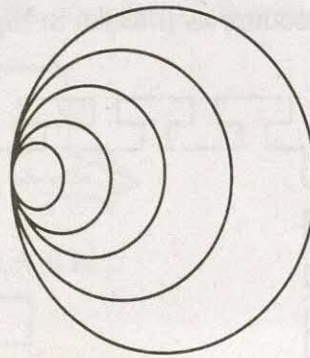
The command MAKE takes a value and puts it in a variable. It takes two inputs. The first input to MAKE command is the variable name, which should be preceded by double quotes ("). The second input is the value, which we want to store for a variable. Here is an example:

MAKE "SIDE READ means that Logo should put whatever the user types in for the variable called "SIDE. SIZE will contain the value typed in by the user. Now try this:

```
TO SPIN
PR[THIS PROCEDURE CAN DRAW SQUARE OF ANY SIZE]
PR[PLEASE ENTER THE SIZE OF THE SIDE YOU WANT]
MAKE "SIDE READ
REPEAT 4[FD:SIDE  RT  90]
END
SPIN is defined
```

Type

SPIN

The monitor displays the message:

THIS PROCEDURE CAN DRAW SQUARE OF ANY SIZE
PLEASE ENTER THE SIZE OF THE SIDE YOU WANT.

Type a number and you get the square of the desired size.

Try Yourself

1. Draw this figure using a
    procedure called POLYGON.
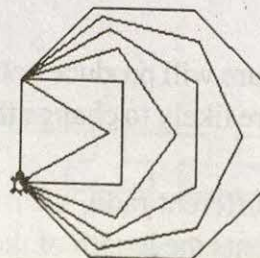
2. Write the following commands separately and show their outputs.
   POLYGON 3 45
   POLYGON 4 90
   POLYGON 11 30
   POLYGON 20 10
3. Write a program for the following picture.
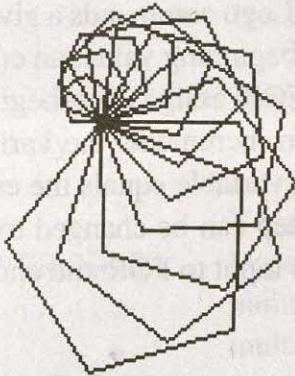
The Turtle Follows Conditions in a Statement

All programming languages allow you to make conditional statements, like: *If this is so, then that must be the other way.* So, from our day-to-day language, we can realise how some conditional statements in Logo look. Some commands associated with conditional statements are:

IF-THEN-ELSE

These commands must abide by the following syntax:
IF statement THEN instructions ELSE instructions
IF runs the instructions when the result of the conditional statement is TRUE. If the conditional statement is FALSE, nothing happens unless ELSE follows the instructions.
Take this example:

```
TO TRY:NUMBER
IF:NUMBER >100 THEN PR[THE NUMBER IS TOO BIG] STOP
FD:NUMBER
LT 90
END
TRY defined
TRY 85
```

The output will be:

TRY 105

THE NUMBER IS TOO BIG

The command **FOR** follows the syntax:

FOR word number number list
(FOR word number number list number)

FOR lets you execute a list of Logo commands a given number of times. Inputs to FOR are a control variable, a beginning value, an ending value and a list of Logo commands to be executed. FOR assigns the beginning value to the variable, executes the run list, and then increments the variable by one. This process is repeated until the value of the variable equals the ending value.

The variable increment step can be changed to a number other than one by listing the increment as a fifth input to FOR and enclosing FOR and all its inputs in parentheses.

Examples:

FOR "I 1 4 [PRINT:I]

1
2
3
4

(FOR "I 1 4 [PRINT:I] 2)

1
3

Checking a Condition in Logo

IF-THEN-ELSE commands ask the computer to check a condition and then execute a command, depending on the result of the check. Consider the following commands

PR [Type your age]
MAKE "AGE READ
IF:AGE >10 THEN [PR [Oh! you are older than I am]] ELSE [PR [You are younger than I am]]

Here Logo stores your age under the variable AGE. It then compares the age with 10. If the age you enter is more than 10, Logo prints 'Oh! You are older than I am.'

If, however, the age you entered is equal to or less than 10, Logo prints on the screen the message 'You are younger than I am'.

We can use the IF-THEN-ELSE combination to make a menu for carrying out some calculations. This program first asks you to enter two numbers. It then gives you a menu of choices, consisting of addition, subtraction, multiplication or division. It performs the operation on the numbers you select.

```
TO CALCULATE
PR [Enter the first number]                    The first number is stored as X
MAKE "X READ
PR [Enter the second number]
MAKE "Y READ                                   The second number is stored as Y
PR [1. Add 2. Subtract 3. Multiply 4. Divide]
PR [Press 1,2,3 or 4]
MAKE "Z RC                                      Your choice 1- 4 is stored as Z.
IF:Z=1 THEN [MAKE "ANSWER: X+: Y]               Depending on your choice, the
                                                numbers are added, subtracted,
                                                multiplied or divided.

IF:Z=2 THEN [MAKE "ANSWER: X-: Y]
IF:Z=3 THEN [MAKE "ANSWER: X*: Y]               The result is stored in ANSWER.
IF:Z=4 THEN [MAKE "ANSWER: X/: Y]
PR:ANSWER                                       The answer is printed.
END
```

Lists and Words

Logo has in its store much more than turtle graphics. One of its well-known features is its ability to handle words as well as graphics.

If you are asked to make a list of fruits you eat, probably you would come out with something like this:

[mango papaya orange plum]

Each fruit is an item on the list that you have prepared. It is not a usual list, with items separated by a space, not by a comma. Suppose you want to print the name of the first fruit of the list. The Logo command for this task will be:

PRINT FIRST [mango papaya apple orange plum]

The screen shows **mango**.

Similarly, the command PRINT LAST prints the last item on the list.

PRINT LAST [mango papaya apple orange plum]

would produce **plum** on the screen.

Can we print all items, other than the first?

PRINT BUTFIRST [mango papaya apple orange plum]

The result will be **papaya apple orange plum**. Use all combinations of the four commands, namely, FIRST, LAST, BUTFIRST and BUTLAST, to print any item from the list.

What would PRINT FIRST BUTFIRST [mango papaya apple orange plum] produce?

Naming the List

It is very inconvenient to keep typing the list every time you want to do something on it. We can enter the list only once and give it a name, FRUITS. The syntax calls for the command MAKE. Type:

MAKE "FRUITS [mango papaya apple orange plum].

Now the list is known by the name FRUITS. However, to tell the computer that it is a list, and not a primitive or a procedure, a colon is put before it. The command:

PRINT FIRST: FRUITS

will print the first item from the list of items. To add an item to our list of FRUITS, use the following commands:

FPUT to add the item at the beginning of the list

LPUT to add the item at the end of the list.

LPUT outputs a new object, which is created by placing the first input at the end of the second input.

Joining Words or Phrases

Logo has commands for joining words to make phrases or sentences. In your list of fruits, you may want to describe mango, the first item, as sweet. This will be a way to do that:

PRINT SENTENCE "Sweet FIRST: FRUITS

The output on the screen will be 'Sweet mango'. The word 'Sweet' and the first item on the list combine to form the phrase 'Sweet mango'.

If you have a list containing just one item, you can use the FPUT and LPUT commands to juggle the words:

For example FPUT "Snow [White]   result in the output 'Snow White'

whereas   LPUT "Snow [White]   result in the output 'White Snow'.

Random Numbers

Logo can pick up random numbers. For example

PR RANDOM 25

will make Logo print a number from 1 and 25. Give the command again. It prints

another number within this range. Numbers are picked up at random. Notice that the command RANDOM 25 results in a number from 1 to 25. Similarly, the command RANDOM 50 will result in a random number from 1 to 50.

Input Commands

Logo accepts a number, a word or a list of words as an input from the keyboard. This means that you can make procedure in which the computer asks a question and makes the user give an answer. Such a command is called an input command. There are three input command: RC, READ or RW and RL.

RC

RC command is used to make single digit input. Enter the following commands:

    PR [What do you want to do]
    PR [1. Go for a walk]
    PR [2. Watch TV]
    PR [Press 1 or 2]
    PR RC

    The computer will print the question and the two possible alternatives on the screen. It will then wait for the input 1 or 2. The only input the computer will accept is 1 or 2. *You do not have to press the Enter key after giving the input.*

    Consider another example. Let us write the procedure for multiplication of the number, say 4, by another number, using the RC command:

    TO MULTI
    PR 4*RC
    END

    When you execute the command, the computer waits for you to input a number. Suppose you enter 5, Logo multiplies 5 by 4 and gives the output 20. If you enter 8 the output is 32. Thus the use of the RC command here helps you to get the product of any single digit number with 4.

READ

This command is used to input larger numbers or words. You have to press the Enter key after the input. For example:

    PR [What is your name?]
    PR READ

    The computer waits for you to input your name and press Enter.

In the procedure MULTI defined earlier, you could use the RW or READ command instead of the RC command, to get the product of 4 and a number of 2, 3 or more digits:

    TO MULTI2
    PR 4*READ
    END

You can now input a number, say 345 or 123, to find its product with 4.

RL

The RL command is used to input a list of words or numbers. For example

PR [What are the names of your two sisters?]

PR RL

The computer will wait for you to type any number of words or numbers and then press the Enter key. These words will form items on the list.

Conversation with the Computer

Type the following procedure:

TO CONVERSE

PR [Which is your favourite fruit?]

PR READ

PR [Is it sweet or sour?]

PR READ

END

When you execute the procedure, the computer prints the question: 'Which is your favourite fruit?' A question mark appears showing that it is waiting for your answer.

After you respond, you get the next question: 'Is it sweet or sour'? And again your answer is awaited. The procedure ends after this.

You can thus write a program to converse with computer in Logo language.

Sorting the Input

Till now you have typed in the inputs required by RC, RW or RL commands. Did you save them in the computer's memory? You can do this by saving the inputs using the MAKE command. For example:

PR [What are your favourite drinks?]

MAKE "DRINKS RL

PRINT FRIST: DRINKS

Here DRINKS is a variable, which will list the name of drinks that you type. The last command above, i.e. PRINT FIRST: DRINKS, prints out the first item on the list that you typed.

Add Colour to Logo

So far you have been working on a white screen with the turtle that draws only black lines. Let's add some colour to Logo lesson.

Background Colour

Type in (?) SETBG 4 and then press Enter. The screen turns red. You can pick up any number from the list below and place it after SETBG to have a desired background:

0	black	5	violet	10	light green
1	blue	6	brown	11	light cyan
2	green	7	light gray	12	light red
3	cyan	8	dark gray	13	magenta
4	red	9	light blue	14	yellow
				15	white

Pen Colour

After choosing the background colour, you must pick up the matching pen colour too. Try:

SETPC 12

You will see the turtle changing the colour. If you draw anything, the turtle will use its present colour till such time when you change it again.

Some Logo versions allow a closed figure to be painted. The Logo command for this is:

FILL

You can fill your squares with different colours. Move the turtle inside a square. Then give the FILL command to paint the area inside the square. Write your program to get the picture in Figure 5.8.

Whenever you run the program for the first time, you will get a black square (Figure 5.8 A). Then you save your program on the hard disk. If you want to load and run your program to see the result again, you may get a red square (Figure 5.8 B).
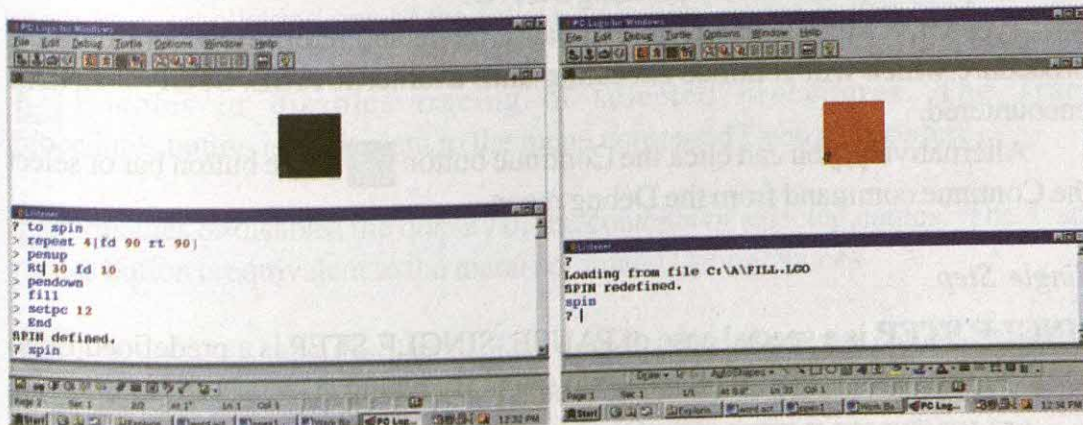
A   B

Fig. 5.8 Coloured SQUARES

Debugging

As you run a Logo procedure that you create, often its outcome is unexpected and not what we really wanted it to be. The computer is a very literal machine and does exactly what we tell it to do. But we do not always say what we mean. That may be all right in real life, but while instructing the computer, we cannot be vague. If we are, it shows up in programs that we write.

A computer language detects mistakes and ambiguities in our instructions. We call them bugs. They are common in computer programming of all types. Because of the procedural nature of Logo and its ability to break a project into small parts, bugs are sometimes easier to find, isolate and eliminate than in some other computer languages.

Nevertheless, it can still be difficult sometimes to figure out why our Logo programs are not acting as we expected. Logo provides several types of debugging tools to help us eliminate bugs from our programs.

Pause

A simple means of debugging is to pause while a procedure is executing and examine what it has done so far. The Logo command **PAUSE** will temporarily halt execution of a procedure and return control to the keyboard without returning to the top of the program. By inserting a PAUSE into a procedure, you can suspend the execution of the procedure so you can examine what it has done so far.

Logo will, however, execute any commands typed at the keyboard while in pause mode, allowing you to examine the value of variables, ascertain the position of the turtle, etc.

You can also click the Pause button 🔅 in the button bar or select the Pause command from the **Debug** menu any time to temporarily pause a procedure. You can also pause a procedure by pressing **Ctrl+Z**.

Type **CONTINUE** or **CO** to exit pause mode and return flow control to the procedure which will continue executing until another PAUSE, STOP or END is encountered.

Alternatively, you can click the Continue button 🔅 in the button bar or select the Continue command from the Debug menu.

Single Step

SINGLE.STEP is a special case of PAUSE. SINGLE.STEP is a predefined Logo name whose value is FALSE when Logo starts. By typing

MAKE "SINGLE.STEP "TRUE

you automatically insert a PAUSE after every command of every procedure. Logo will execute commands one at a time (a single step) and put you in single step pause

mode after each one. Single step pause mode is indicated by the prompt:

SINGLE.STEP ≥

When in pause mode, you can type commands at the keyboard. Logo will tell you what it is doing between each single step, indicating what is being evaluated and output.

You can also turn single stepping on and off by selecting the Single Step command on the Debug menu. This command acts like a toggle; selecting it will either turn single stepping on or off.

Trace and Trace.Level

You can follow your procedure step by step to see exactly at what point its behaviour departs from what is expected. TRACE is a pre-defined Logo name whose value is FALSE when Logo starts. By typing

MAKE "TRACE "TRUE

Logo will automatically print information on the Trace window about its internal operations on the monitor. This information includes what is being evaluated and output as Logo executes each command in a procedure.

The pre-defined name TRACE.LEVEL determines the detail of the information that TRACE provides. TRACE.LEVEL can be set at level 1, 2, or 3. The value you put for TRACE.LEVEL determines the amount of detail Logo reports about its internal operations. The higher the level, the more detail is reported. When Logo starts, the value of TRACE.LEVEL is 2.

Debug Buttons

You can also enable and disable debugging for selected names, property lists, or procedures by clicking one of the following buttons on the button bar:

Enables or disables tracing of selected procedures. The Trace procedures button is equivalent to the menu command Debug/Procedures.

Enables or disables the display of the contents of selected names. The Trace names button is equivalent to the menu command Debug/Names.

Enables or disables the display of the property lists of selected names. The Trace properties button is equivalent to the menu command Debug/Properties.

Debug Dialog

When you choose to trace procedures, names or property lists with either the buttons or the menu commands, Debug Dialog appears. This allows you to select which

procedures, names or property lists you want to trace. All the available procedures, names or property lists are displayed in the left window of the Debug Dialog. Select the ones you want to trace in the left window and click the button to move it to the right window which lists the procedures, names or property lists currently being traced. The reverse process eliminates a procedure, name, or property list from being traced. When you close the Debug Dialog and run your Logo programs, the appropriate trace window automatically opens, showing the output or value of the procedure(s), name(s), or property list(s) you specified.

TABLE 4

Logo Primitive Command Summary

Commands	Shortcut	Action
Forward n	FD n	Moves the turtle forward by n turtle steps
Backward n	BK n	Moves the turtle backward by n turtle steps
Right n	RT n	Turns the turtle right by n degrees
Left n	LT n	Turns the turtle left by n degrees
Repeat	-	Repeats the command/procedure n times
Hideturtle	HT	Makes the turtle invisible (it will move much faster when invisible)
Showturtle	ST	Makes the turtle visible again
Clearscreen	CS	Clears the graphics screen and returns the turtle to home position
Clean	-	Cleans the screen but leaves the turtle where it is
Home	-	Sends the turtle to home position but leaves the drawing as it is
Penup	PU	Lifts the turtle's pen so it doesn't draw while moving
Pendown	PD	Puts back the turtle's pen down so it draws while moving
Penerase	PE	Changes the pen to an eraser
Color	-	To set the colour

SETBG n	-	Sets the background colour
SETPC n	-	Sets the pen colour
Fill	-	To paint an inside area
Fence and Wrap	-	Sets the screen boundaries
Pots	-	Gives the list of all procedures
Load	-	Recalls the procedure from hard disk
Save	-	Saves the procedure on hard disk
Print	PR	To print the following information on to screen
Sum	-	Adds two numbers
Textscreen	TS	Changes the complete screen to the text mode
Fullscreen	-	Changes the complete screen to the graphic mode
Spiltscreen	SS	Brings back the normal Logo screen
If-Then-Else	-	To check the condition in procedures
Make	-	It makes the computer remember things
Print First	-	Prints the first word or item on the list
Print last	-	Prints the last word or item on the list
Butfirst	-	Removes the first word or item on the list
Fput	-	Adds the item at the beginning of list
Lput	-	Adds the item at the end of list
RC	-	Used to input a single digit input
Read	-	Used to input a bigger number or words
RL	-	Used to input a list of words or numbers

Try Yourself

1. Make the unit in A and create B out of it:
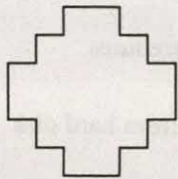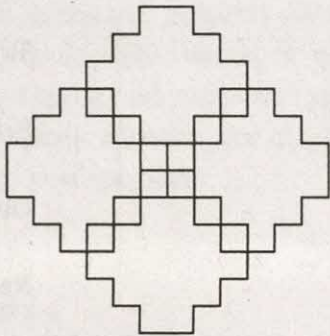
A   B

2. Find out the structural unit in the following picture:
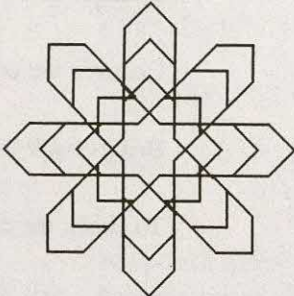
3. Draw these pictures:
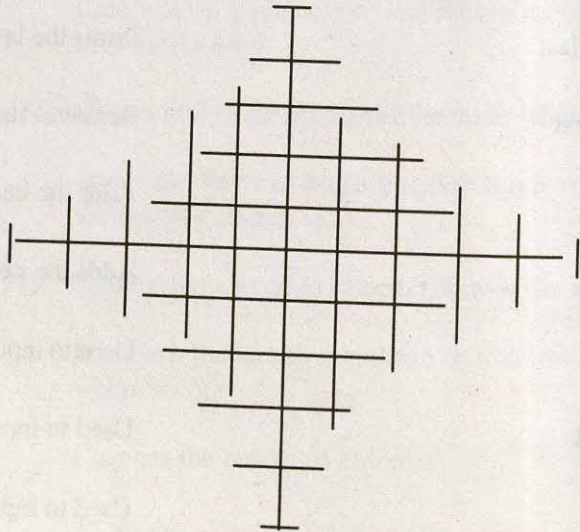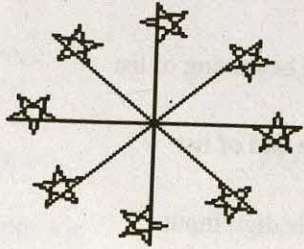
Exercise

1. Write a procedure to draw this screen ruler.
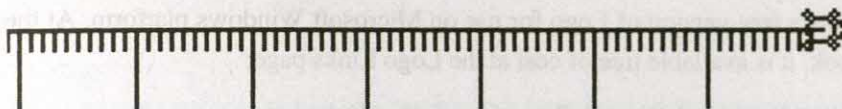
2. Write procedures to create the figures below:
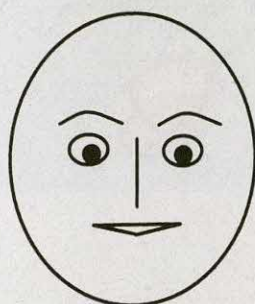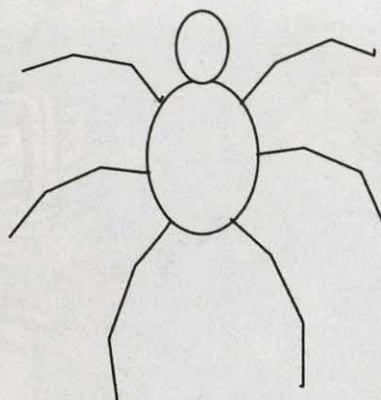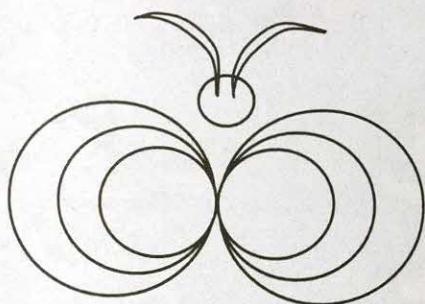
3. What is the output of this procedure?
    TO DESIGN:LENGTH
    >FD: LENGTH LT 90
    >IF: LENGTH =60 THEN STOP
    >DESIGN:LENGTH+2
    >HT
    >END

Note for the Teacher

Logo is useful for teaching programming style. But all Logos are not equally powerful. It is possible for children to create 3D and animated pictures using the language. But PC Logo would not help.

MSW Logo is a free version of Logo for use on Microsoft Windows platform. At the time of writing of this book, it is available free of cost at the Logo Links page:

http://www.media.mit.edu/groups/logo-foundation/links.html.

A unique feature of MSW Logo is its ability to support 3D graphics. Children with good spatial awareness will get a great deal through exploration of their ideas with 3D commands in MSW Logo.
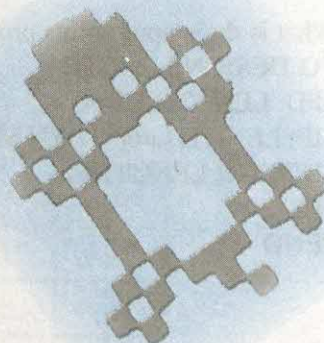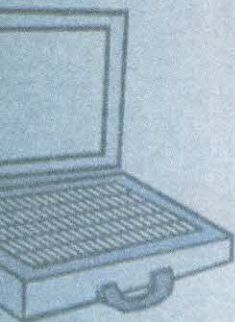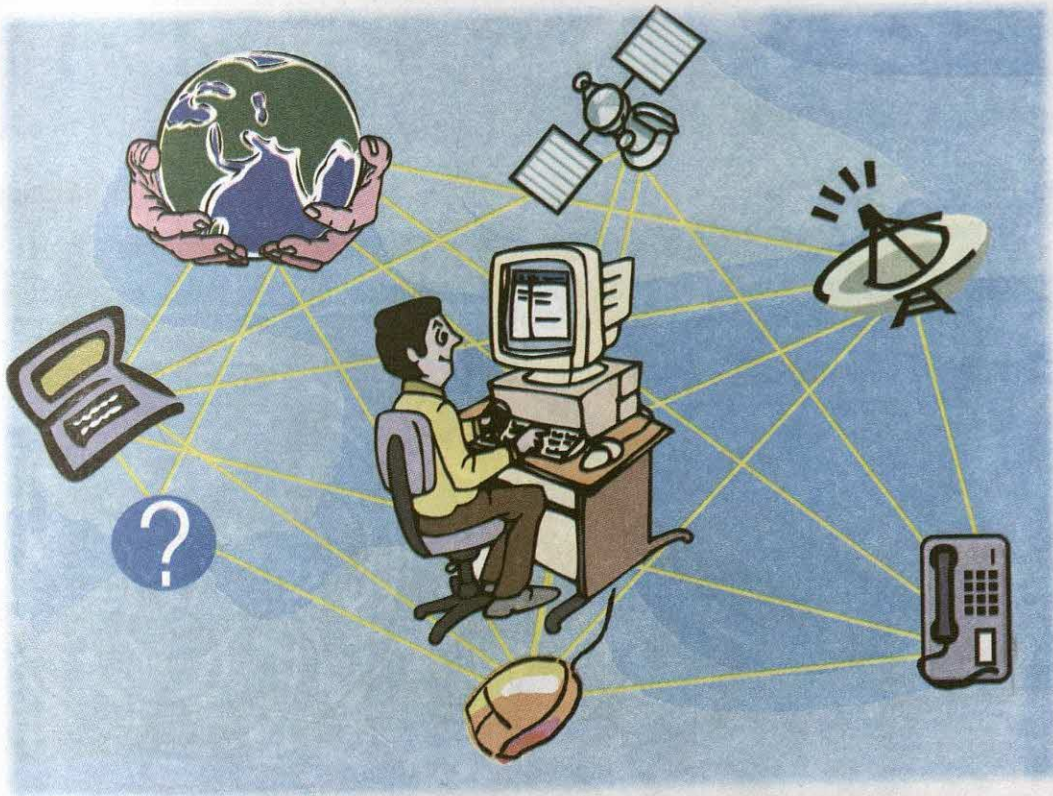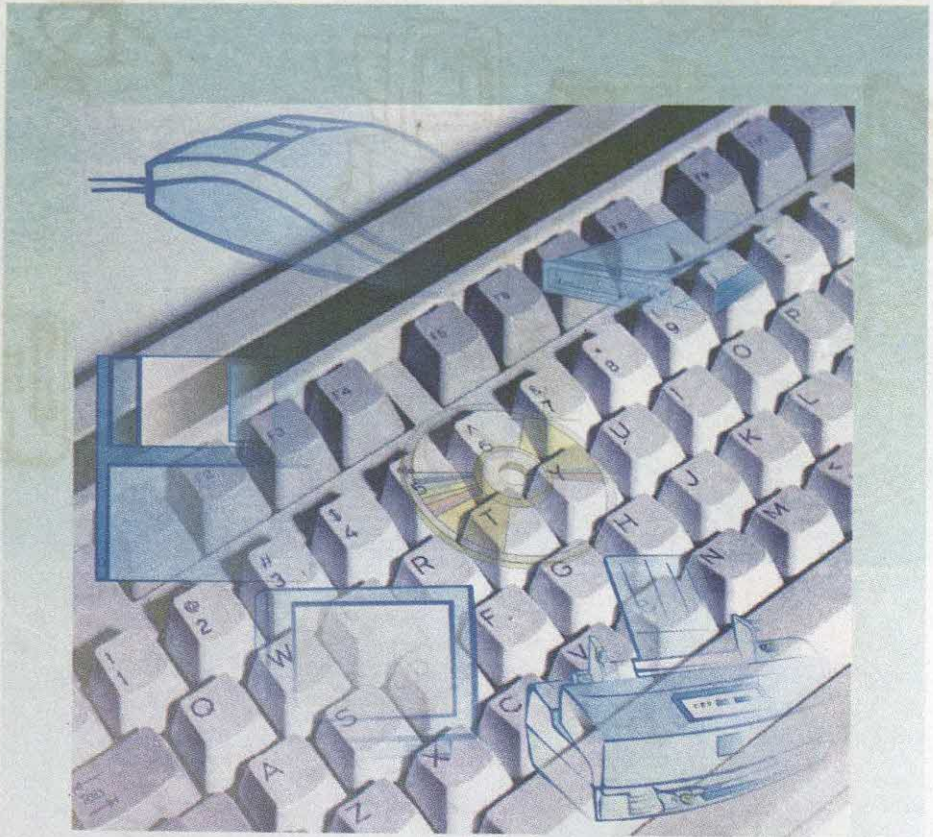
Communication
Tools
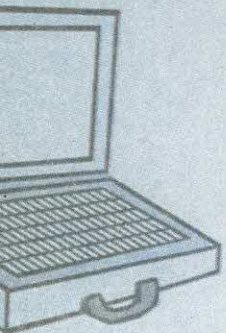
Communication on the Internet

Learning Objectives

☐ Explaining what is Internet
☐ Explaining terms: client/server, Web Site, Web Page, home page, hyperlink, TCP/IP, HTTP, URL, FTP
☐ Using Web browsers (Netscape Communicator or Internet Explorer), directories and search engines
☐ Adding to Bookmarks and Favorites and sharing them
☐ Saving pictures and text from a Web Page
☐ Saving a page or picture without opening it
☐ Copying information from a Web Page into a document
☐ Composing, sending and receiving e-mails
  ▪ Writing a message
  ▪ Sending a message
  ▪ Sending an attachment file
  ▪ Printing a message
  ▪ Deleting a message
  ▪ Forwarding a message
  ▪ Sending a reply to a message
☐ Subscribing to newsgroups
  ▪ Posting message to newsgroups
  ▪ Replying newsgroup message
  ▪ Sending large messages
  ▪ Finding messages in a newsgroup

The Internet and the World Wide Web

The **Internet** is a network of networks although a single computer can also connect to the Net. How many computers make the Internet? *Many millions* is a safe guess, for no one knows how many millions! The number is growing by the day.

Each one of those computers stores a huge amount of information to be shared with others. As these computers are connected to each other, through telephone lines or satellites, the path for sharing information is readily available. Information
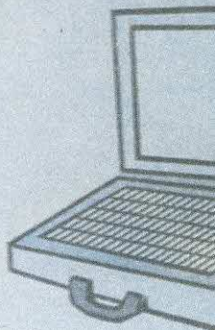
is the key to our existence. Therefore, sharing information with others and making use of it, to suit our needs, provide a useful learning exercise.

The **World Wide Web** (or the Web or www) is one of the services available on the Internet. The Web is not the Internet. It uses a method called *hypertext* that hides the actual commands and addresses that you use to move from one place on the Net to another. You click on plain English words or images highlighted in some way and get access to text, pictures and programs at widely scattered places and get to see them on your computer screen. The Web brings in the multimedia elements into the Net.

The Internet and Web Terminology

You may have heard of a host of Internet-related terms before. So that you readily understand what some of those terms used in this Chapter really mean, here is a simple introduction to the ideas that they convey.

Client and Server

The information that you will access through the Net is stored on computers called servers. A server stores information for use by clients. A client is a computer, or a computer program, that knows how to communicate with a particular type of server to use the information stored on that computer.

Each type of Internet activity involves a different type of client and server. To use the Web, you need a Web client to communicate with Web servers. That Web client is called a Web browser (e.g. Netscape Communicator or Internet Explorer). For e-mails, you need an e-mail client to communicate with e-mail servers.

Fig. 6.1 Home page of a company that deals in coffee

Web Site, Web Page, Home Page and Hyperlink

A Web Site is a particular Web Server or a part of a Web Server where information about a florist's shop or a library or a museum or a bookstore or a newspaper is stored. When you use a Web Browser to contact a Web Site, the information on the server is displayed on your screen. This screenful of information is a Web Page. It is a file of information stored on a Web Server.

A home page is the first of the Web Pages put up by an organisation or a university or a commercial firm (Figure 6.1). For example, the Internet Explorer may take you to the starting page on Microsoft's Web Server (Figure 6.2).

Fig. 6.2 The Home Page of Microsoft's web server

Hyperlink or link is an object in a Web Page that you can click to jump to another page or another part of the same page that you are on. Links can be blocks of text or pictures. When you point to a link, the mouse pointer changes to a small hand. Usually hyperlinks are underlined and displayed in blue.

TCP/IP, HTTP, URL and Domain Name

Every network that is part of the Internet and every computer that is part of a network exchanges information according to some rules or **protocols**.

Two protocols used for working with the Internet are **Internet Protocol** (IP) and **Transmission Control Protocol** (TCP). Now, each network and computer system on the Internet has a unique numeric address, called the **IP address**, which also has a corresponding name. When information is passed from one computer to another, the Transmission Control Protocol (TCP) makes it into small packets. Each packet has the IP address of the sender and the IP address of the recipient. It is the
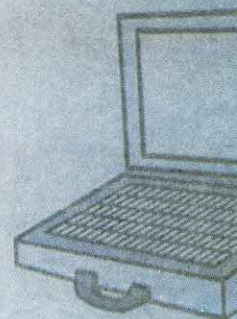
Internet Protocol that finds the convenient route on the Internet for each packet. At the destination, the TCP reassembles the packets into the complete information. This is something like printing small parts of **War and Peace** on thousands of postcards and sending them by post. All postcards do not follow the same route to reach the destination, but ultimately they are received and reassembled into the huge book at the receiver's end.

The World Wide Web protocol is named *http*, which stands for Hypertext Transfer Protocol. The documents, pages or screens passed from servers to clients are in hypertext format.

URL stands for Uniform Resource Locator. It is the globally recognised address of the documents and other resources on the World Wide Web, e.g. http://www.ronainc.com is the URL for a company that deals in coffee (Figure 6.1). The first part of the address indicates what protocols must be followed to communicate with this address and the second part is the IP address where the resource is located.

That brings us to IP addresses and domain names. Every computer on the Internet has a unique address. This address can be written in two ways. One, as an IP address, which is a set of four numbers punctuated by (.)s, e.g. 195.25.100.13. But it is difficult to remember such numbers. There must be something easier. So, the other way of writing the address of the same computer is as a domain name. The domain name is as unique. A domain name is web-based equivalent of IP address. So the above IP address may have the domain name **mybusiness.com**. The domain name forms part of the URL, which, in this case, may be http://www.mybusiness.com.

Browser

A Web Browser is a program that lets computers communicate with Web Servers and displays the information stored there. Internet Explorer and Netscape Navigator are well- known examples. Navigator is a part of Netscape Communication.

Equipment to Surf the Internet

Well, that was some terminology! It's time we did something on the Internet. To use the Internet, however, we need to have our name registered with an Internet Service Provider (ISP), like Videsh Sanchar Nigam Limited (VSNL), Mahanagar Telephone Nigam Limited (MTNL) and many others. That means we need Internet connection. In fact, you can have Internet connection through any of the three main sources:

- A national internet service provider
- A local ISP in your city or town
- A commercial online service.
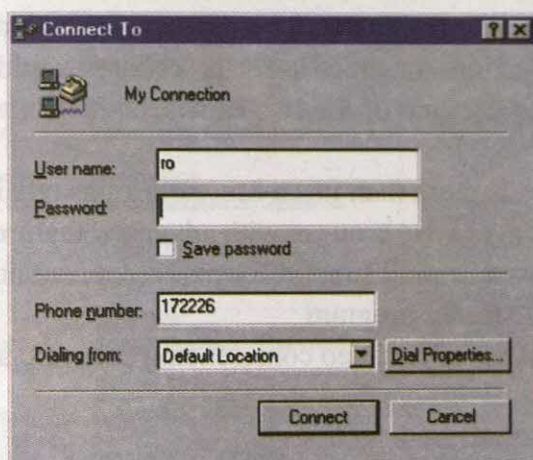
Fig. 6.3 Connecting to the Internet

Once registered, you get a **User name** or a name recognised by your service provider. This is also known as **User ID**. You shall also get a Password, to be known to you alone. It is not proper to use others' passwords even if we know them.

We also need a **modem** (short for a device called modulator-demodulator) that connects your telephone line with your computer. The function of the modem is to convert the message from your computer to a form that can travel through the telephone line. At the same time, the modem converts the message that comes through the telephone line to a form that is understandable to your computer.

Log on to the Internet

To log on to the Internet, switch on the computer and the modem. Make sure the telephone hand set is down. Double click on the icon for your ISP on the Desktop. You get a dialog box having two buttons, **Connect** and **Cancel** (Figure 6.3).

Click on the Connect button. As you get through the telephone line, you reach what is called the Post-Dial Terminal Screen. Type User name and Password. Password is *case sensitive*. That means, if the original password is in capital letters, you must write capital letters whenever you have to write the password. If it is in small letters, you must type it in small letters. If your password is **natalie**, you must write natalie. Natalie or NATALIE will not do.

Your Internet service provider requires each subscriber to use a unique name, called a User Name (or User ID). The user name prevents just anybody from using the service.

The Password helps prevent an unauthorised user from using your user name to sneak into the system. Your password is for you alone. No one else should know it. Entering your user name and password to go online is called **logging in** or **signing in**.

After those are verified by your Service Provider, double click the browser icon on the Desktop or on the **Status Bar**, at the bottom of the screen.

The speed of a modem is expressed in kilobits per second (kbps). The higher the number of kbps, the faster the modem. A faster modem makes web pages appear more quickly on your screen.
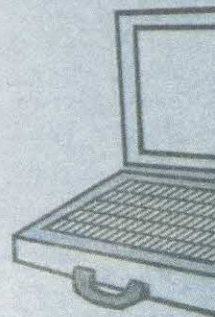
The preceding description is true for a dial-up connection. But there are other types of Internet connections for which log on procedures would be slightly different.

You are likely to use one of the two browsers, Netscape Communicator or Internet Explorer.

Communicator is more than just a browser; it has other features too:

- **Navigator** An easy to use browser with advanced features
- **Messenger** Internet e-mail support for messages containing multimedia
- **Collabra** A newsreader program
- **Conference** Offers voice/video conferencing software and
- **Page Composer** Helps create web pages.

Explorer is no less powerful. It has:

- **Internet Explorer Browser** An easy-to-use Web browsing program
- **Outlook Express** A versatile program for composing, sending, reading and organising messages.
- **Net Meeting** Voice/video conferencing software
- **FrontPage Express** To create and publish Web Pages
- **Chat** A client software that enables people to chat, i.e. communicate real-time in the e-mail mode.

Surf the Web

Surfing the Internet means visiting sites for the information you need. There is no single way to search for specific information. You can follow one of the two ways.

One, choose a **directory**, where Web Sites are organised by broad topics and sub-topics. This is like the Yellow Pages telephone book. The best example of the first category is the Yahoo! site, which you can reach by typing http://www.yahoo.com into the address box at the top of your web browser (Figure 6.4).

Fig. 6.4 The Yahoo! home page

Fig. 6.5 Information heads that Yahoo! offers

Magellan (http://www.magellan.excite.com) and the Internet Public Library (http://www.ipl.org) are less popular but useful directories. If you intend to use a directory, say Yahoo!, first select the broad area of your search from the list that Yahoo! offers (Figure 6.5). If you are looking for some information from the exciting history of South American soccer, choose *Recreation and Sports* first and then narrow your focus onto soccer and then, may be, on Pele or Maradona.

Fig. 6.6 Search result for ajanta caves

The other, often more effective, way of Web surfing is using **search engines**. A search engine is a database system designed to index internet addresses (URLs, FTP, image locations, etc.). Search engines are designed to perform searches on the Net. They visit other Web Sites and update their own catalogues of Web Pages. The search results are more specific. Google (http://www.google.com), Alta Vista (http://www.altavista.com), Excite (http://www.excite.com) and HotBot

(http://www.hotbot.com) are much used search engines. Figure 6.6 is an example of a search result for *ajanta caves* through *Google*. The search has yielded a large number of Web pages of which the list of only a few is visible in the picture. Click on any one of those and you will be taken to the respective site for more information.

While looking for information using a search engine, you can use AND, OR and NOT to include, choose out of two options and exclude items from the search. For example, we could have written **ajanta caves OR ellora temples**, instead of ajanta caves for our search. In that case the pages containing 'ellora' would not have been included in the list.

Boolean Searching

Boolean searching allows you to enter advanced searches directly as text in the search field.

Three common Boolean operators are AND, OR and NOT.

- The AND operator between two words or other values means you are searching for documents that contain both the words or values, not just one of them. An example is "pear AND apple."
- The OR operator between two words or other values means you are searching for documents that contain either of the words. An example is "pear OR apple."
- The NOT operator between two words or other values means you are searching for documents that contain the first word before the NOT operator, but not the second word that follows it. An example is "pear NOT apple."

Bookmark Your Favorite

Some of the pages of the search result in Google may be useful for your research on Ajanta and Ellora (Figure 6.6). So you may like to visit them again, but you want them quick! How do you do that? You do the same thing that you do when you wish to re-read part of a book: place a bookmark at the right place so you don't have trouble finding the page quickly again.

Communicator has the provision to **Bookmark** the page. In Explorer, you add the page to **Favorites** (note spelling). Both have the same function: to bring the page to you instantly as you are connected to the Net.

To add a page to Bookmark, open the page, click the Bookmark button on the Toolbar or choose Bookmark from the menu bar. Click Add Bookmark.

The new Bookmark is added to your list of Bookmarks. Its name is the title of the web page it points to. If the page is untitled, its URL appears in the list.

If you are an Explorer user, go to the page you want to add to Favorites. From the menu bar, choose Favorites and then Add to Favorites. A dialog box opens. The name of the current page appears in a text box. Click OK.

After you have created a new bookmark or favorite, it appears as an item in the bookmarks or favorites menu. To use the bookmarks and favorites, open the menu and choose an item from the list.

Video or animated clips cannot be directly copied into a document. Where permitted, you can download and save such clips in a file. Right click on the URL. In the menu that appears, select Save Target As. A File dialog box will appear. Select a folder, type in the file name and click on Save.

More on Bookmarks and Favorites

Internet Explorer automatically imports all your Communicator bookmarks. On the Favorites menu, click the Imported Bookmarks folder to view them. If you use both Internet Explorer and Navigator, you can keep your favorites and bookmarks up-to-date with each other by importing them between programs.

To import bookmarks or favorites, click the File menu, and then click **Import and Export**. To export favorites to bookmarks, click the File menu and then click Import and Export.

Organise your Bookmark and Favorite Pages into Folders

As your list of favorites grows, you can keep it organised by creating folders. You might want to organise your pages by topic. For example, you could create a folder named Art for storing information about art exhibits and reviews. Steps to follow are:

- On the Favorites menu, click **Organise Favorites**
- Click **Create Folder**, type a name for the folder and press Enter
- Drag the shortcuts (or folders) in the list to the appropriate folders
- If the number of shortcuts or folders makes dragging impractical, you can use the **Move to Folder** button instead.

Save Pictures or Text from a Web Page

As you view pages on the Web, you'll find information that you would like to save for future reference or to share with others. You can save the entire Web Page or any part of it, text, graphics or links.

You can save Web Pages on your hard disk. Go to the File menu and choose Save option. If you choose that, you can save the current Web Page as a file on your hard disk. It is possible that only the text of a page is saved, not its images. If you think you need those images, print the page rather than saving it. Alternatively, you can right click on an image. You get a menu which would direct you how to save the image as a separate file.

To get a printout of the entire page that you have opened, choose the print button on the toolbar or choose Print from the File menu.

Electronic Mail

E-mail is part of the Internet. Why is it so important? E-mail is the most convenient and reliable method of sending and receiving information. It is fast, easy to operate and inexpensive. An e-mail can be sent to or received by anyone who has an e-mail address. When we send an e-mail, it goes from your computer to the recipient's computer as a file, which is read by him.

The e-mail message can be sent instantly without any delay. It reaches the

To download a page, click on the File menu →Save As sub menu. In the Save Web Page dialog box, select in the Save in box the folder where you want to store the data. Type in a file name in the File name box. In the Save As type box, select either Web Page or Complete (.htm,. html) or Text File (.txt). Click on Save.

To download a picture, right click on it. To store the picture in a file, click Save Picture As., type in a file name and click on Save. To copy this picture in a document press Ctrl+V or click Paste on Edit menu.

mailbox of the receiver directly. You can confirm whether your message has been delivered to the recipient. Even if the recipient is not available, the e-mail can be delivered in his box. He will be able to read it as and when the opportunity arises. An e-mail can be sent to any part of the world with very little expense, at the cost of a local telephone call. Not only messages, but large documents can be sent as files attached to your mail. Any previously typed Word document, a presentation made in PowerPoint or a scanned picture may be sent at no extra cost. You can send the same mail to a group of people at the same time. You can forward a mail received by you to another person.

An e-mail address has two parts. The first part or the user name and the domain name of the server are separated by a special symbol, @ (for at).

This domain name can be common for lots of people who use the same service. You may think of this as the locality and city for your house address. To make each address unique, the user name is different. The e-mail addresses julie@vsnl.net.in and julie_75@vsnl.net.in have the same domain name but they are different addresses. The domain name contains the Internet service provider's name and tells the type of organisation it is. Sometimes, it may also contain the country code. In the above two cases, the top-level domain name (it is read from right to left) **in** stands for India. In fact, all servers outside the USA carry the name of the country where they are located. Watch domain names. They often end with **au** (for Australia), **bw** (for Botswana), **il** (for Israel), **in** (for India), **uk** (for the United Kingdom) or some other abbreviation for some other country. But a lot more domain names do not have the country name.

If you are working in off-line mode, the computer cannot send the mail to the addressee. It will store it in its **Outbox** or **Unsent Message**. When you are on-line, i.e. connected to the Internet, choose File and then **Send Unsent Messages**, if you are using the Messenger. Whenever you receive a message in **Outlook Express** (it is a part of MS Office), all outbox mails are automatically sent.

Compose, Send and Receive E-mail

There are two steps for sending an e-mail :
- Composing the mail
- Sending the mail.

These two steps are independent of each other. You do not have to be connected to the Internet to compose your mail. You can do this in **offline mode**. However, when you send mail, you have to be connected to the Internet.

Composing and Sending an E-mail

Open Outlook Express by double clicking its icon on the Desktop (or by clicking its name in the Program list) and click on the **New Mail** button or **Compose Message** button on the Toolbar (depending on the version you are using). In
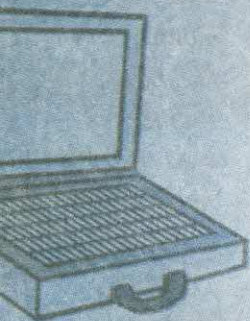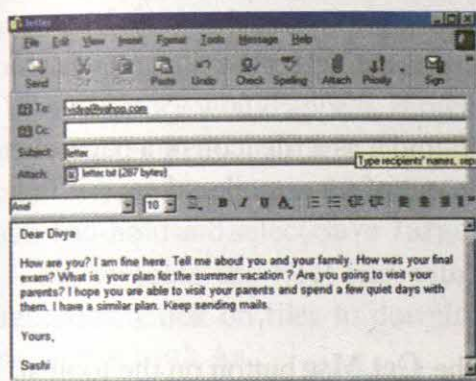
Fig. 6.7 The message has been written

Messenger, click the **New Message** button. A blank form appears. In the **To** line, type the e-mail address of the person you want to send your message to. In case you want to send the same message to a number of persons, type their addresses in the To line and put a semicolon after each address except after the final one.

The **Cc** bar is for the address where you may like to send a carbon copy of your mail. This is optional. For a personal mail to a friend, you are not likely to use this. The **Subject** bar is for saying what your mail is about. Again, for personal letters, we normally do not indicate a subject.

Click in the blank space to start typing your message (Figure 6.7). You can do one of two things now. You can choose File and **Send Later,** or click the **Send** button to send your mail immediately if you are on-line.

Attach a File with the Mail

Suppose you have written a story or painted a picture that you wish to share with a friend, e-mail is a great help. Save in your computer your story or note or picture or whatever you wish to share with others. A file sent with the e-mail is called an attachment, for it is attached to a regular e-mail (Figure 6.8). You can send almost anything with an e-mail that is saved in a file.

Fig. 6.8 Mail with an attachment
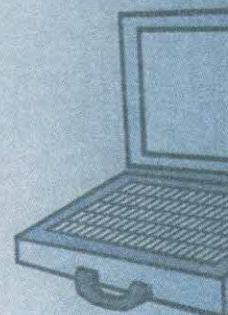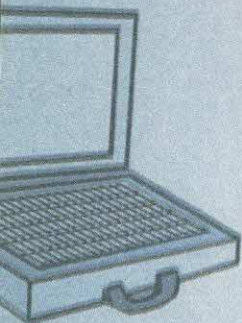
To attach a file, type the address and compose the message as usual. Then click the Insert File button (the paper clip icon) in Outlook Express or the **Attach** button in Messenger. A dialog box will appear in which you can select the file you wish to attach and send it. Avoid long files.

When you receive an attachment file, you'll find it as a file icon or a paperclip icon. To save it as a separate file, drag the icon out of your mail and save it in a folder.

Receive e-mails

To receive a message in Messenger, just click the **Get Msg** button on the toolbar. In Outlook Express, open Inbox and click the **Send and Receive** button on the toolbar. If there are no messages for you, the status bar at the bottom of the window will carry the words: **No new messages on server**. If there are new messages, you will have them in the **Inbox** folder. If there are new messages, they are copied to your PC. You can read them from the Inbox folder on-line or off-line. To save a message, select Save on the File menu. Give the file a name and click OK.

Forward a Message

You can pass on a copy of the message that you have received to another person. Highlight the message in the Inbox folder and click Forward button. This produces a copy of the message automatically. You can edit this copy before sending it to a "third party". Enter in the To text box the e-mail address of the person you want to forward the message to. Click OK.

Send Reply to a Message

When you get an e-mail and want to send a reply to it, click the **Reply** button. A mail composing window will come up on the screen, with the e-mail address of the sender already entered in the To text box. You only have to type in your reply and then send it.

File Transfer Protocol

FTP is a program that allows files to be transferred back and forth across the Internet. It allows you to log in to a remote server, view what files the server contains and either *download* (copy remote files to your own computer) or *upload* (copy files from your computer to a remote server). FTP only copies files; it does not remove them from the originating source.

Both the Web browsers named in this chapter are multipurpose clients. That means, they can be used as FTP clients *as well*, for *downloading files* from FTP servers. From a browser, you may use FTP by entering FTP URL in the address box. A typical FTP URL looks like this: ftp://ftp.microsoft.com.

Once logged into the site, you will be prompted for a log in name and password. Normally, the log in name is **anonymous** or **log in anonymous** and the password is your complete e-mail address.

A directory would appear, showing folders and documents on the FTP server. Each item on the list is a link. If you are using Internet Explorer, click on files and download commences, in the same way as from a Web page. You can right click or click-and-hold and select **Save Target As**.

To navigate the FTP site with Netscape, click folder icon to open sub-directories. Click on files to download them. Right click or click-and-hold and select **Save Link As**.

FTP capabilities of a Web browser are good enough for most people, but not for those who want to upload files. To upload files you need real FTP client software. To use these clients, you must learn and use a family of FTP commands. A graphical FTP client, like WS_FTP (for Windows) is an ideal choice. It combines the simplicity of a Web browser and the power of FTP.

Newsgroups

A newsgroup is a platform for exchanging ideas. It is a collection of messages posted by individuals to a news server; you can find newsgroups on practically any subject. The topic names are arranged hierarchically so that people can look for and find newsgroups of their interest systematically.

To use newsgroups in Outlook Express, your Internet service provider must offer links to one or more news servers. After you set up an account for each server you want in Outlook Express, you can read and post messages in any of the newsgroups stored on the news server.

When you find a newsgroup you like, you can "subscribe" to it so that it is displayed in your Outlook Express Folders list. Subscribing provides easy access to your favourite newsgroups, eliminating the need to scroll through the long list on the server each time you want to visit a favourite newsgroup. Newsgroups can contain thousands of messages, which can be time-consuming to sort through. Outlook Express has a variety of features that make it easier to find the information you want in newsgroups.

Add a Mail or News Accounts

For a news account, you'll need to know the name of the news server you want to connect to and, if required, your account name and password.

On the **Tools** menu, click **Accounts**. In the **Internet Accounts** dialog box, click on the **Add** button. Select either **Mail** or **News** or **Contacts** (through contact we can add address in Address Book) to open the Internet Connection Wizard and then follow the instructions to establish a connection with a mail or news server.

Often you may find your way to an FTP site through your web browser. As you click on links, you may not even be aware that you are connecting to an FTP site.

In newsgroups, the lines that appear in the top pane are message headers. The actual article is the body of the message.
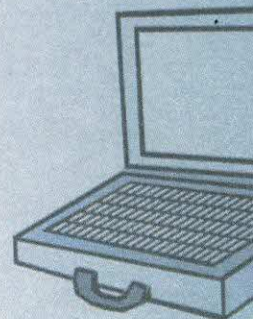
Subscribe to a Newsgroup

The benefit of subscribing to a newsgroup is that it is included in your Folders list for easy access. You can subscribe to a newsgroup in any of the following ways: When you add a news server, Outlook Express prompts you to subscribe to newsgroups on that server.

Click a news server name in your Folders list and then click the Newsgroups button. Select the newsgroup that you want to subscribe to and then click the **Subscribe** button.

When you double-click a name in the Newsgroup list, a subscription is automatically generated. When you view a newsgroup without subscribing to it, its name appears in your Folders list. Right-click the name and then click Subscribe.

Post messages to Newsgroups

There are several ways you can post messages, depending on whether you are posting a new message or replying to one and how widely you want it to be distributed. You can also format messages, and add your signature, business card or links to files. Note that some of these options require that the recipient's newsreader can read HTML. Many newsreaders cannot.

To post a message to a newsgroup, go to the Folders list, select the newsgroup you want to post a message to. On the toolbar, click the **New Post** button.

To send your message to multiple newsgroups on the same news server, click the icon next to Newsgroups in the New Message dialog box. In the **Pick Newsgroups** dialog box, click one or more newsgroups from the list (hold down the Ctrl key to select multiple newsgroups) and then click Add. You can choose from all newsgroups or only those you subscribe to by clicking the **Show only subscribed newsgroups** button. Type the **Subject** of your message. Outlook Express cannot post a message that does not contain a subject. Compose your message and then click the Send button.

Reply to a Newsgroup Message

In the message list, click the message you want to reply to. To reply to the author of the message by e-mail, click the **Reply** button on the toolbar. To reply to the whole newsgroup, click the **Reply Group** button on the toolbar.

If you want your reply to go to additional newsgroups on the same news server, click the icon next to Newsgroups in the Reply dialog box. In the **Pick Newsgroups** dialog box, select a newsgroup from the list and then click Add. You can choose from all newsgroups or only those you subscribe to by clicking the Show only subscribed newsgroups button.

Type your message and then click Send.

To Delete a News Message

News messages are stored on a news server. In order for them to be available for other people to read, they cannot be deleted from the server. However, you can delete newsgroup messages that have been downloaded to your computer.

On the Tools menu, click Options. On the **Maintenance** tab, click the **Clean Up Now** button. Click the Browse button and select either a news server or a specific newsgroup and click OK. To delete message bodies only for the selected item, click the **Remove Messages** button.

Find Messages in a Newsgroup

While in a newsgroup, click the Edit menu, point to Find and then select **Message in this Folder**.

In the **Look for text** box, type the word(s) you want to search for and then click **Find Next**. If your search returns too many results or doesn't give you what you want, click the **Advanced Find** button and type in as much information as possible to refine your search.

The Internet, E-mails, Viruses and Worms

That is all very nice – the global network for sharing information and communication. That is what makes the technology so very exciting. But this is also the network that carries computer viruses. Files downloaded from the Internet and e-mails, especially the unsolicited ones, are the prime suspects as virus carriers. Regular update of your anti-virus is necessary to keep up with the new viruses that have been released since your anti-virus was installed or last updated.

Thousands of different viruses and allied programs exist and they have been classified in many different ways. Here are some variations on the basis of how they function.

Time Bomb

A time bomb is a virus that does not launch its attack as soon as it infects your PC. It may exist in your machine for days, weeks or even months before it is detected. The damage is caused either on a certain date or after the system has been booted a certain number of times.

Logic Bomb

A logic bomb is a virus, which is triggered by the appearance and disappearance of specific data.

Trojan Horse

A Trojan horse is a program that does something different from what it should be

Computers downloading Intenet files is the principal point of entry for computer viruses. Be sure your computer has anti-virus software.
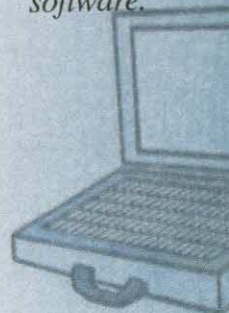
doing. It is different from a typical virus in that it does not necessarily replicate itself to destroy data. It gives the impression that it is doing something very appealing while it actually does something disastrous.

Take an example. A program may be disguised as a useful spreadsheet while, in reality, it could be written to erase the hard drive.

Worms

A worm is as destructive as a virus. Like a virus, it reproduces itself and spreads from one host computer to another (Unlike a virus, it does not attach itself to a file to replicate itself). Worms are spread via security weaknesses in e-mail software. They enter Internet host computer and find other hosts to which they mail themselves. The worm does not destroy data, it slows down the computer's operations.

Viruses and other dangerous programs are most often found on public domain software (available on the Net). If you must use a program from such high-risk sources that may contain virus, check the disk with a virus detection program.

Exercise

1. Write an e-mail address where user ID is Ankit and domain address is whizkid.com.

2. Send a leave application through e-mail to your school principal.

3. Send your birthday invitation to some of your friends using e-mail.

4. Send your travel experience in brief as an attachment file to your friend. Include a couple of snapshots.

5. Ask your friend to send an e-mail to your school address and receive the same.

6. Use *reply* button to send your reply.

7. Using a search engine visit Web Sites of six museums and write a report on your visit.

Try Yourself

Find the dialog box that customises your browser. Replace the URL of the current home page with a new home page.

Note for the Teacher

These are a few paragraphs on manners in cyberspace, not a legal manual. These are not prescriptive for students using the Internet and e-mails. Instead, this is for you to help children imbibe the Net Etiquette while they start visiting cyberspace.

The Internet connects networks throughout the world. There is no central agency controlling it. People from different countries, cultures and backgrounds use it. All this diversity often leads to indifference to feelings and concerns.
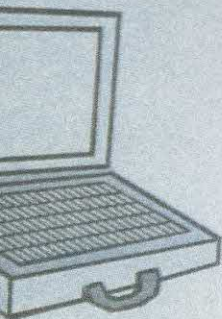
When the child enters a new culture — cyberspace has its own — he is liable to commit a few social blunders. He might offend people without meaning to, might misunderstand what others say and take offense when it is not intended. It is possible to forget that one is interacting with other real people — not just ASCII characters on a screen. The impersonality of the medium often changes a meeting between two people to something less personal. Humans exchanging e-mail often behave the way some people behind the wheel of a car do. They curse at other drivers and even behave rudely. Most of them would never behave that way with others at work or at home.

The message of *Netiquette* is that such behaviour is not acceptable. Adhere to the same standards of behaviour online that you follow in real life. Standards of behaviour may be different in some areas of cyberspace, but they are not lower than in real life.

One more point on *Netiquette* ethics: If you use shareware, pay for it. If you use someone's intellectual property, ask for permission beforehand. Copyright laws generally protect materials on the Net. Copying electronically is easy. This does not mean it can be used without permission.

In many cases, we still do not know how some law applies to cyberspace. Two examples are the laws on privacy and copyright. Some laws are so obscure or complicated that it is hard to know how to follow them. If children are tempted to do something that is illegal in cyberspace, chances are it is also bad Netiquette.

When we send e-mails or post to a newsgroup, we are taking up other people's time (or hoping to). It is our responsibility to ensure that the time they spend reading our posting isn't wasted. Messages should always be brief.

On the Net, we reach out to people we would otherwise never meet. And none of them can see us. We shall not be judged by the colour of our skin. We shall, however, be judged by the quality of our writing. For most people who choose to communicate online, this is an advantage; if they did not enjoy using the written word, they would not be there. So spelling and grammar do count.

In addition, make sure notes that children write are clear and logical. It is possible to write a paragraph that contains no errors in grammar or spelling, but still makes no sense whatsoever. This is most likely to happen when children are trying to impress someone by using a lot of long words that they don't really understand themselves. It is better to keep it simple.

Finally, children should be pleasant and polite. They should not use offensive language or be confrontational for the sake of confrontation.

Of course, a child would never dream of going through others' desk drawers. Naturally they wouldn't read others' e-mails either. Unfortunately, a lot of people would.

E-mail is on-line conversation. If we receive a sensitive material, we don't forward it to others. E-mails enable us to respond immediately. This may sometimes incite 'flaming' – some reaction that we should better avoid. Restraint is the keyword.

In our correspondence with newsgroups, we don't use all uppercase letters. We don't post ads or anything that looks like an ad. Leaving the subject line blank or changing the subject while replying to a post is forbidden. A conversation thread is a series of messages with the same subject line. If it is changed, the message that we send will be treated as a new article. It will no longer look like a reply to a message.
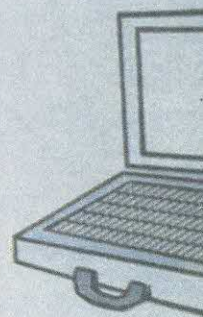
Everyone was new on the Internet once. So when someone makes a mistake — whether it's a spelling error or a stupid question or an unnecessarily long answer – we should be kind about it. If it is a minor error, we may not need to say anything. Even if we feel strongly about it, we should think twice before reacting. Having good manners ourselves doesn't give us license to correct everyone else.

If we do decide to inform someone of a mistake, we should point it out politely, and preferably by private e-mail rather than in public. We should give people the benefit of the doubt, assuming that they just don't know any better. And never be arrogant or self-righteous about it. Notes pointing out Netiquette violations by others are often examples of poor Netiquette.
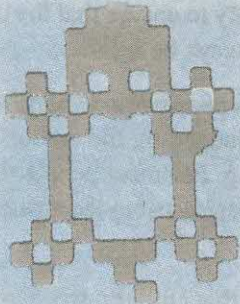
Technology Research Tools

Searching the Net

Learning objectives

- ☐ Distinguishing different types of resources available on the Internet
- ☐ Identifying some of the key Internet resources
- ☐ Collecting a list of Internet sites that can support study and research
- ☐ Explaining difference between different search tools – search engines, Web directories and subject gateways
- ☐ Explaining the issue of information quality on the Internet
- ☐ Avoiding common pitfalls of Internet use.

A Tour in Cyberspace

It is common knowledge that the Internet presents a vast array of resources you need to make your explorations easier and more effective. Such resources can be organised into several broad categories. You can readily recognise some of those.

Web Sites: Broad Categories

The importance attached to education by the Government and the obvious potential of the Internet for education mean that there is a large amount of official information, along with educational materials, published on the Internet. Figure 7.1 shows the variety of information available in the educational Web Site of the Ministry of Human Resource Development. The Web Site of MHRD also contains a learning basket for various stages of school education (Figure 7.2).

As well as Governmental sites, there are innumerable sites put up by all possible kinds of organisations. Electronic journals, articles, books, statistical data, teaching materials, on-line courses, lecture notes, learning packages, newsgroups for discussion and dissemination make the Internet a rich source for your research and study. The Net has the widest and fastest reach to sources of information for us to collect, analyse, interpret and make use of.

This chapter may serve as a site-seeing tour to look at some key Internet sites. You can look at major landmarks that give you a flavour of the full range of sites available. If you want to explore sites, add them to your own personal bookmarks.
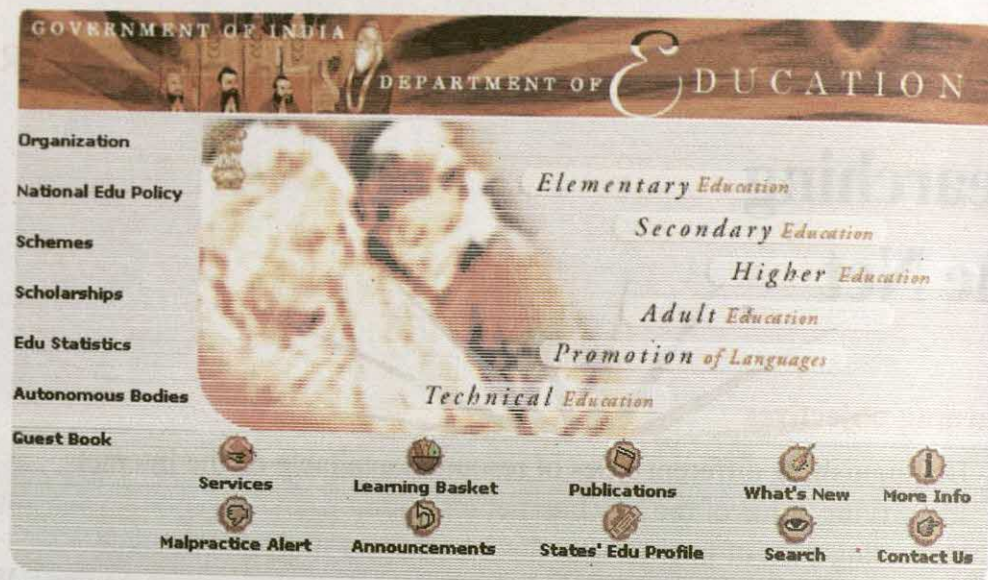
Fig. 7.1 *Categories of information on the Web site of the Department of Education, Government of India*
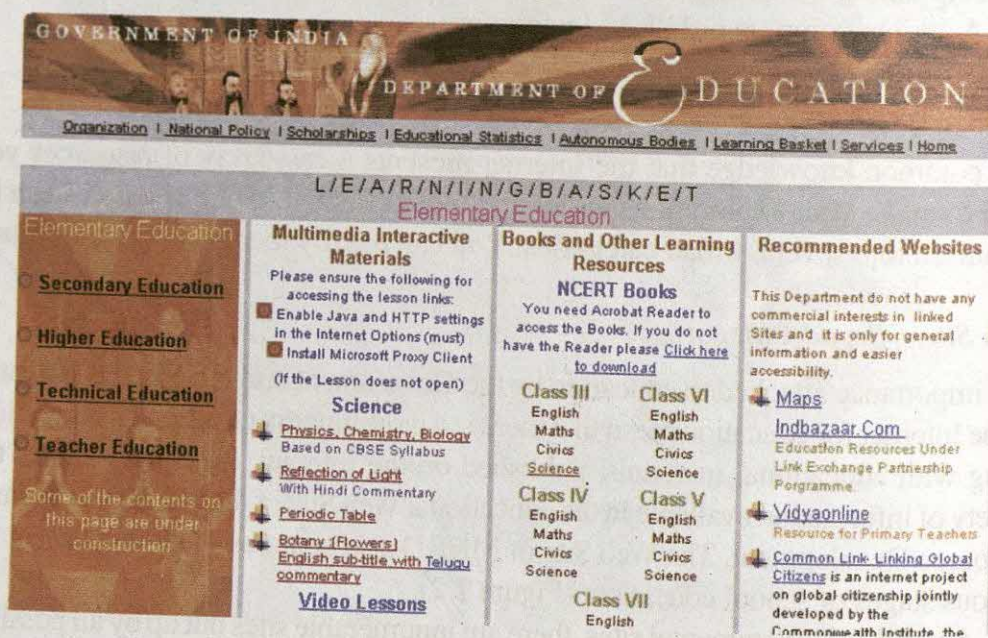
Fig. 7.2 *The Learning Basket for elementary education on the Web Site of the Department of Education*

Tour Tips

How can you make the most of a journey through the Web? Here are some hints, tips and reminders to make your explorations effective.

Prepare and Plan	Plan an overall search strategy.
Time	The Internet can be a great time waster if you are not clear what you are looking for. Remember your plan and stay focused. Do not let yourself be tempted down to many side roads and away from your goal.
Money	There are many sites which ask for money before they let you visit them fully. Avoid such sites. Don't part with money for documents.
Help	Some resources are large and require exploration. Use whatever navigation aids are provided—a site index or map or maybe a search facility. Avoid the temptation to leap straight in, particularly when using an online database. Test it out and read the FAQ (frequently asked questions) or Help pages.
Rely on Browser	When looking at individual Web Pages, use the "Find in page" facility of your Web browser to locate specific words or phrases; use the Bookmarks/Favorites facility to keep track of useful sites you might want to return to.
Problems?	If a Web page takes a long time to appear on the screen, there is probably a problem somewhere—try using the Reload/Refresh button on your browser. If this doesn't work, you will need to try again later. Don't forget that in general Internet traffic is busier in the middle of the day. One way to avoid jams is searching in the early morning or evening.
	If a link doesn't work and produces an error message, try removing the tail end of the address until you find a page which does work and try navigating about where the site is based, and what type of site it is (e.g. if *okumedia.cc.osaka-kyoiku.ac.jp/educ/index-e.html* does not work, make it *okumedia.cc.osaka-kyoiku.ac.jp* and see if it does).

Discover

What is important is information seeking skill. You have to be able to use a range of tools to find resources to support your learning.

Search Tools

We all know that there are millions of sites on the Internet, which have something or the other for you. But how do you find them and all the other sites that you are interested in? You need to be able to find what you want without wasting time and with a level of skill which gives you confidence in your search results. There is a range of different tools that will help you: search engines, Web directories and subject gateways. They do different things and need to be used appropriately.

You used some of the search engines while working on the previous chapter. Computer programs, trawling through the Internet automatically, looking for anything and everything, create search engines like AltaVista, HotBot, Google, etc. They index the full text (or at least a large chunk of it) of each page they find. Although they are enormous, they are not complete indexes to the whole Internet. You search them with your own choice and combination of words, phrases, etc. (i.e. you create your own search strategy). Till date the two finest tools for searching the Web with small children are Ask Jeeves Kids (http://www.ajkids.com) and Yahooligans! (http://www.yahooligan.com) (Figure 7.3). Be familiar with these superb sites and what they offer.
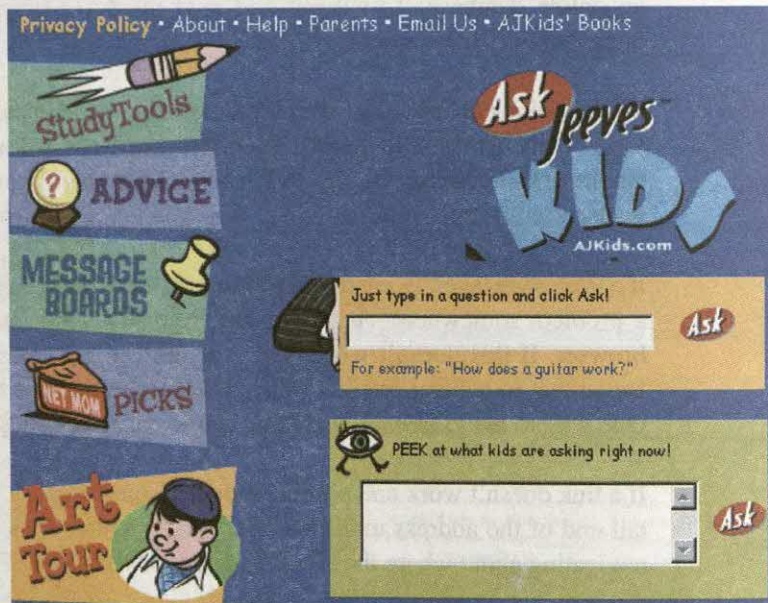
A

B

Fig. 7.3 Ask Jeeves Kid and Yahooligan! are still the finest search tools for children

On the other hand, it is the human editor who selects sites and organise them into subject groupings for Web Directories like *Yahoo!* or *Magellan*. They are usually very large and multi - subject. They are meant for all kinds of visitors. Quality control can vary from a lot to none! You use them by browsing through a hierarchy of subject categories (Figure 7.4).

Arts & Humanities Literature, Photography...	**News & Media** Full Coverage, Newspapers, TV...
Business & Economy B2B, Finance, Shopping, Jobs...	**Recreation & Sports** Sports, Travel, Autos, Outdoors...
Computers & Internet Internet, WWW, Software, Games...	**Reference** Libraries, Dictionaries, Quotations...
Education College and University, K-12...	**Regional** Countries, Regions, US States...
Entertainment Cool Links, Movies, Humor, Music...	**Science** Animals, Astronomy, Engineering...
Government Elections, Military, Law, Taxes...	**Social Science** Archaeology, Economics, Languages...
Health Medicine, Diseases, Drugs, Fitness...	**Society & Culture** People, Environment, Religion...

Fig. 7.4 Categories under which sites are classified in Yahoo!

*Some search
engines allow
you to put a
(+) for AND
between
keywords (with
no space), e.g.
goopie+bagha.
Put a (-)
instead and it
would act as
NOT.*

Subject Gateways are built by subject experts. A high level of quality control is maintained. Internet sites are hand picked, described, indexed and classified by experts. The selection is geared towards the academic community. They are usually subject focused and are relatively small. Well-known examples of gateways can be found grouped together under a service called the **Resource Discovery Network** (RDN). The RDN Web Site will help you locate the right gateways for your need and also enable you to search across several of them simultaneously.

Remember that much of the "fine detail" of the Internet is hidden from the sorts of tools described here. For instance the contents of library catalogues, bibliographic databases and electronic journals and other document collections are generally invisible to the search engines. One needs to labour really hard to find those fine details.

Search Tips

When looking for resources, you need a strategy. Your strategy will include both choosing which tools to use and the way you use them. How you use a particular tool will depend on the actual topic you are looking for and the power of the search engine, database or gateway you are using.

If you need high quality, evaluated sites or are looking for materials about a particular subject, then you should start with the subject gateways and perhaps move on to the directories and search engines. If you are looking for a particular

organisation or some other unique thing, then the search engines (used correctly) will work very well. Most of the time a combination of search engines and subject gateways will be needed.

When browsing directories you have to find your way through a set of subject headings created by some other person. So you may need to try several routes and different ways of classifying your subject in order to find the right place in the directory structure.

When working with search engines you will need to create a very focused, specific search strategy. When you search the subject gateways you can be more general and broad in your choice of search terms, because the subject gateways arrange things on the basis of their quality over quantity. You will find fewer sites but they will be of high quality.

Always read the "help" files when searching to discover the precise "rules" of each system, e.g. how to search for phrases, how to combine different terms, etc.

When you use a search tool for the first time, explore it and test it with some subjects you know already, rather than straightaway using it for your current search.

Review

Is everything available on the Internet reliable? Is everything of high quality? The answer is: NO. Therefore, we must understand why there's an issue of information quality on the Internet. How do you know what to trust and what not to trust? How do you evaluate the different resources you have found?

You need to be careful at all times and consult your teacher in order to judge if a resource is credible. Don't rely completely on the resources you find on the Internet. Often better resources or information exist only in print, in traditional library collections. Knowing when to stop your Internet searching and revert to print sources or to ask your teacher or the school librarian for help is vital. Having found a Web Site, always question its quality and don't use it to support your academic work until you have discussed it with your teacher. *Always record your search results.* If you mention Internet resources in your project work, you need to make sure you cite them correctly. Note:

- Who has created the site?
- When was the site created (how up-to-date it is)?
- Where is the site maintained (in which country)?

When you find high quality information that you want to use, make sure you cite it correctly and remember to insert quotation marks if you have copied and pasted text into your work.

Exercise

1. Research a topic and develop a multimedia presentation that will include text, graphics, video, animation found on the Internet and in the library.
2. Design an on-line project.
3. Develop a virtual museum on Mohenjo Daro, containing text, pictures and references of your sources.
4. Collect weather data on your region for a specified period. Collect information on temperature, rainfall and humidity through on-line survey.

Note for the Teacher

One particular problem for people interested in education on the Internet is the potential confusion between things that are about education, teaching or learning, etc. and things that could be used in education, teaching or learning of any subject. This mix is often difficult to avoid in searching, but you will also come across it frequently when browsing through directories.

One advantage of the various Resource Discovery Network (RDN) subject gateways is that this confusion is very much reduced if not eliminated because of their specialist subject focus and because of their expert editors.

▪ For example, SOSIG (Social Science Information Gateway) is a RDN gateway covering all the social sciences and it has a specialist section on education. You will also find subsections, which include learning and teaching resources for the various other subjects covered by SOSIG. SOSIG is a browsable collection but you can also search either the whole collection or just one of the specialist sub-sections. Through SOSIG, you will find full text documents, working papers, news sources, organisations, societies, associations, statistics, etc.

▪ If you don't find in SOSIG what you need, try the Social Science Search Engine which will lead you to a much wider range of resources, because it includes further Web Pages from sites already listed in the main SOSIG gateway. It is a half way house between the focus, selection and quality control of SOSIG and the breadth, depth and inclusiveness of the general search engines.

▪ An alternative gateway for education is the Education Virtual Library maintained by the Charles Stuart University in Australia.

For more detailed advice on searching for educational subjects, try Search Strategy for Education, a set of Web pages produced at the Institute of Education of the University of London providing guidance on search strategy when using a range of search facilities—bibliographic databases, general search engines, etc.

Integration of Web-based activities into the school curriculum is a challenging task. Much of it depends on your initiative. One of the easiest activity is communication with peer groups. Be sure to structure communications by providing a goal, besides socialisation. Students may be paired via e-mail with experts or others of influence in the field they are studying. Students so paired can work together to meet a challenge or solve a problem. Students can use the Internet to publish their research, writings and accomplishments. Students writing to real audiences write more. Some sites will display their work for free.

Web Sites provide access to information and resources not normally available in a traditional school library. Such resources can form the material basis for project work. Students can create Web Sites and have their work published on the site. It is a highly

fruitful exercise for students to come up with their own project ideas and utilise the unique resources of the Web to establish those ideas. Web projects easily integrate ideas across the curriculum.

Internet searches could lead students to undesirable sites. Here are some solutions to the problem. They are by no means a complete solution, but they indicate the minimum steps a school should take to ensure the security of children using the Internet:

Establish a clear set of rules Children should be taught at the earliest opportunity that they are responsible for their actions on the Internet. They must follow certain rules determined by the school.

Monitor children's use of the Internet The most reliable method of making sure children are in the right path is to work with them or near them. A regular glance at the screen will ensure that things are going all right in a classroom situation. Make sure that the screen is visible and not facing away from you.

Monitor the links children use A well designed Web Site should provide children with all the safe links they need. Failing this, a comprehensive set of well chosen links in the Favorites (Internet Explorer) or Bookmarks (Netscape) menu should suffice.

Use a proxy server Many of the Internet Service Providers offer a proxy server/site filtering service. This prevents children accessing undesirable sites even if they type in the exact address. Your ISP may have a list of inappropriate sites and will automatically prevent them on request.

Invest in Internet safety software There are several software packages available that claim to prevent access to unsuitable materials on the Internet of which *Netnanny* and *Cyberpatrol* are perhaps the best known. These programs are available to try for free. You can download an up-to-date databases of *unsuitable sites*. But to download these, you might have to pay.

Be vigilant You can shock children by revealing a list of all the sites accessed and keywords used each day. Software such as Secret Boss will e-mail a teacher with the latest list each day regardless of any attempt to delete the history files and the contents of the Temporary Internet Files.

Tools
for
Problem Solving

Spreadsheet

Learning Objectives

❑ Explaining the concept of spreadsheet
❑ Working on a Workbook
❑ Creating a Worksheet
❑ Opening an existing Worksheet for modifying data
❑ Making calculations on a Worksheet
❑ Editing/modifying a Worksheet
❑ Seeing a page in
  ▪ Normal view
  ▪ Page Break view
  ▪ Full Screen view
❑ Making graphical representations of numerical data
❑ Closing a Worksheet
❑ Saving Worksheet with name

Start the Program

An electronic spreadsheet is one of the earliest application programs. It uses a row and column format. The intersection of a row and a column is a cell. A cell may hold numbers, text or a formula relating its value to the value of other cells. A change to a cell anywhere can ripple through all related cells immediately.
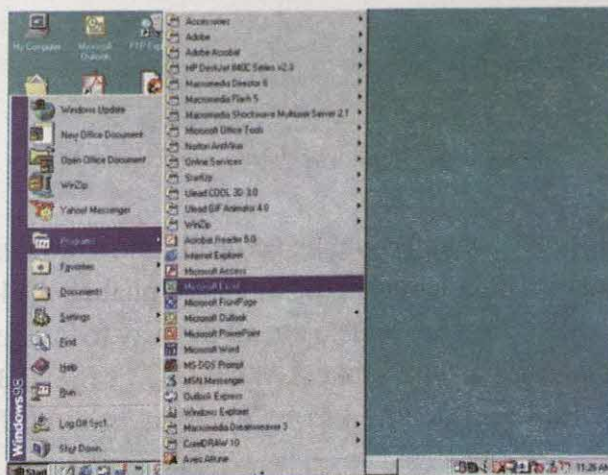
Fig. 8.1 Getting into Excel

A spreadsheet can be used productively as a general purpose tool for organising information. You should be able to apply what you learn in this chapter when exploring, say, mathematical and scientific models.

A number of electronic spreadsheet programs are available which would help you create a worksheet. Until a few years back, **Lotus 1-2-3** was a widely used program. We are going to use the spreadsheet program **Excel**, which is part of **Microsoft Office 2000**.

To start Excel, click the Start button, select Programs and click on Excel in the list of programs (Figure 8.1). If your Desktop already has the icon for Excel, double-click on it. The Excel window, called Excel workbook, appears on the screen (Figure 8.2). A workbook is an electronic file that contains one or more worksheets. Worksheets are like pages of a book that are available to you when the workbook is open.
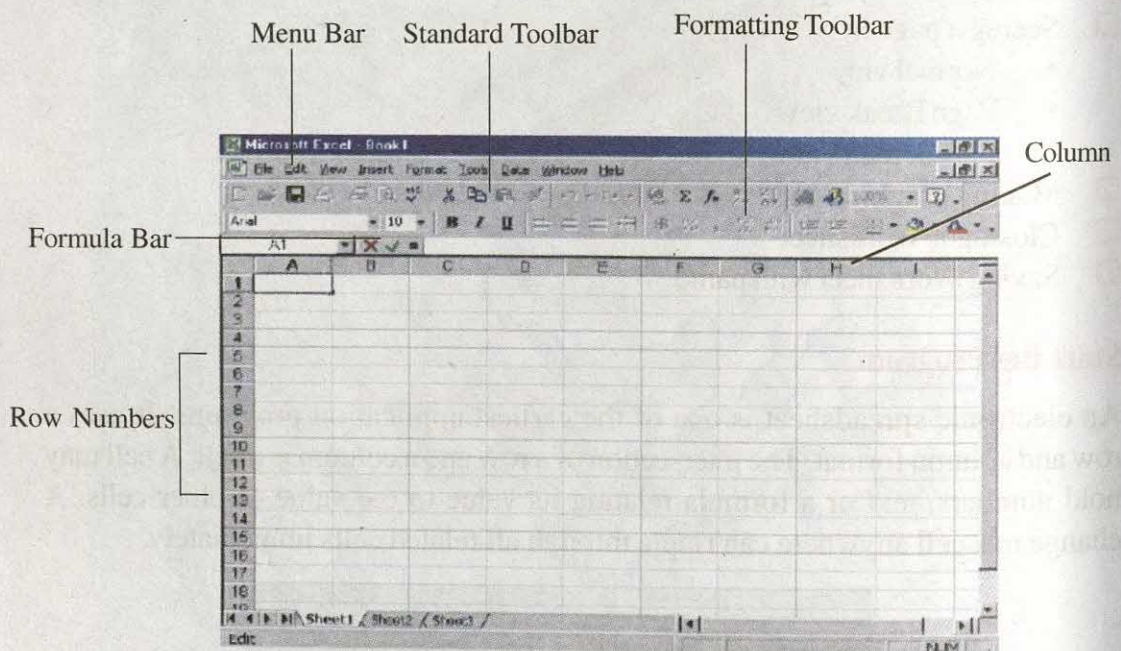
Fig. 8.2 Excel workbook, worksheet 1

You see a number of columns running vertically and rows running horizontally. The columns are named after letters of the English alphabet; the leftmost column is A, the one next to it is column B and so on, all the way to Z. Columns after Z are named after combinations of letters, like AA, AB, AC … BA, BB, BC and so on till the 256th column. Rows are referred to by numbers, starting from 1 at the top, followed by row 2, then row 3 and so on till 65536.

Excel has 65536 rows and 256 column. How many cells are there?

The intersection of a row and a column is a rectangle – a cell or a box or a slot. It has a unique address derived from the intersection of the row and the column that creates it. So the cell address is written with the column letter or letters first, followed by the row number, e.g. G14 or KB12. What you see on the computer screen is a small window on a huge worksheet. You can only see one small part of the sheet through this window at a time. The cursor indicates the cell where your work is going to be done. With an electronic spreadsheet, you can move, or scroll across the surface of the worksheet.

The electronic spreadsheet program allows you to interact with the sheet, writing into the cells one of three things — a label (i.e., a piece of text), a value (i.e., a number, such as 179) or a formula. It is this last feature that has made the electronic spreadsheet an important analytical tool. When you enter new values into the cells, you may instantly see their effect across the entire worksheet if there is a formula to cause such changes. All necessary recalculation is done automatically according to the formula defined for each cell. The spreadsheet organises and calculates, analyses and presents the results. Each of these capabilities can be easily adapted to your specific areas of interest and tailored to your particular type of work. One of the most important analytical applications of the spreadsheet is "what-if" analysis. What-if analysis allows you to quickly determine what will happen to a spreadsheet model if you change the underlying assumptions. Given its power and versatility, a spreadsheet program is not limited to a single type of application. It can be applied to the needs of the scientific, engineering and other academic areas, as well as those of business and finance.

Create a New File

To create a new file, click on the File menu and then click on the option New. A dialog box will appear (Figure 8.3). Click on Workbook, then on OK. A new workbook opens. It contains several screens called worksheets, like Sheet 1, 2, 3 but only worksheet 1 is visible.
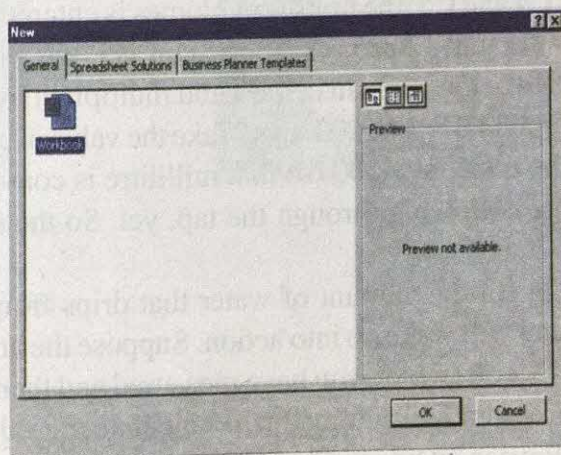
Fig. 8.3 Opening a new workbook

Enter Data

When the mouse pointer is moved in the work area, it changes from an arrow shape to a plus sign (+). Choose a cell where you wish to input data, click your mouse on the cell. If you want to move from cell to cell you can use the arrow keys.

Suppose you want to enter some data in B1, click the mouse on the cell; now B1 is an active cell (Figure 8. 4).

As a very simple example of spreadsheet use, let us imagine that we wish to calculate the volume of water lost through a dripping tap in an hour or during a day.
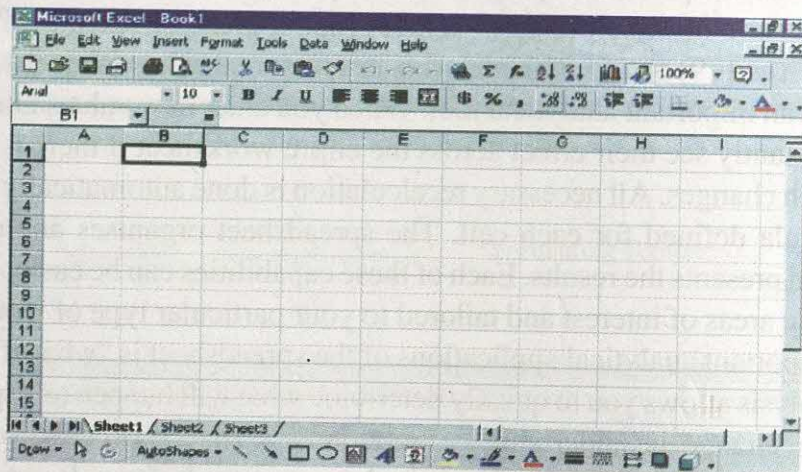
Fig. 8.4 Choosing a cell to enter data

It is good to put a heading on the worksheet. So in the first row, we enter the label WATERLOSS. Into the three cells next to each other, we enter three labels, one for *Time*, one for *Flow* and one for *Unit* in cells A3, B3 and C3 respectively. The labels allow us to identify what is in each column. This leaves row 2 empty and makes the final appearance neater.
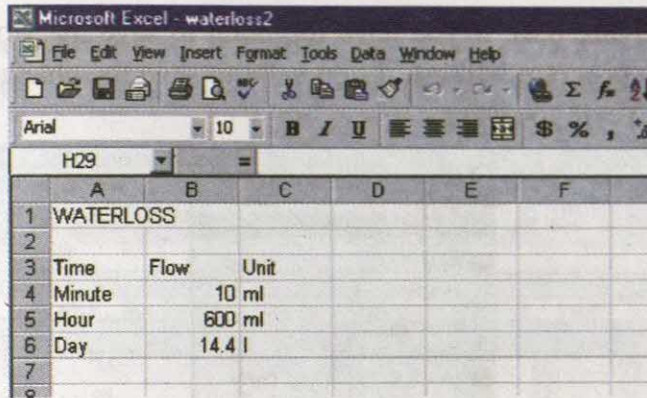
Then in the three cells A4, A5 and A6 we enter Minute, Hour and Day respectively. In cells C4 and C5, the units for volumes is entered, i.e. ml (millilitre). In cell C6, we enter the unit Litre i.e. l. In the cell B5, we would put a formula B4*60, which says " Take the value in cell B4 and multiply it by 60".

In cell B6, the formula B5*24/1000 says "Take the value in cell B5 and multiply it by 24 and divide the result by 1000 (so that millilitre is converted to litre)".

See that no water is flowing through the tap, yet. So the cell B4 indicates 0 (zero).

Now you enter in B4 the amount of water that drips from the tap and your innocent looking model will wake up into action. Suppose the amount of water that drips in one minute is 10 ml (which you have measured and then entered as a value in the cell B4). The program will automatically calculate the values for B5 and B6, i.e. the amount that flows in an hour and in a day respectively.

You can copy the formula you just wrote in other cells. The copies will calculate numbers in their respective cells.

Fig. 8.5 *Water loss at the rate of 10 ml per minute*

Look again at the worksheet. As the simple example now stands, we can see at a glance that the water loss for a minute is 10 ml, for an hour it is 600 ml and for a day it is 14.4 l (Figure 8.5). If we now discover that our figure for the flow per minute was wrong and in fact it should have been 7 ml, we can simply change the value corresponding to Flow to the new value in B4. The values for hour and day would then automatically change.

All worksheets are saved each time you save the workbook.

Save Worksheet

You may now like to save your worksheet WATERLOSS. From the File menu select Save (Figure 8.6). A dialog box appears. Type the file name and click Save as shown in Figure 8.7.

Fig. 8.6 *Save Worksheet*
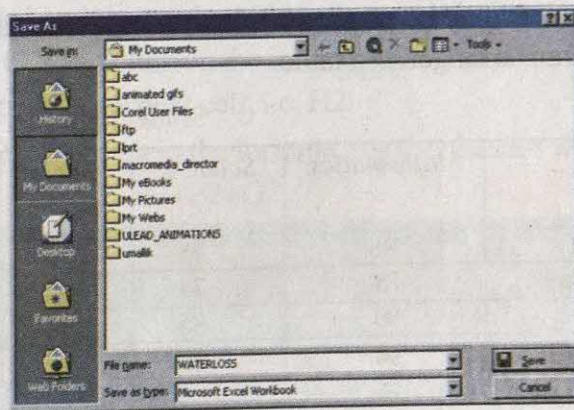
Fig. 8.7 *Save WATERLOSS*

The file is now saved.

Close a File

Once your work is over and you have saved your worksheet in the computer's memory, you may want to leave the program. In order to do that, select Close from

the File menu (Figure 8.8). If you have forgotten to save the worksheet before trying to exit, the program will ask if you want to save the changes made in the worksheet. Click Yes if you want.
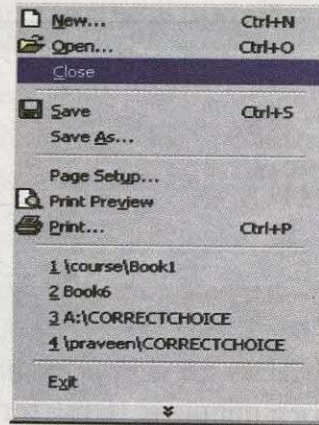
Fig. 8.8 Closing a Worksheet

Retrieving Waterloss

In case you want to work on the worksheet again, you have to retrieve it. Go to File menu, select Open, find out the location of the file (folder, if any, drive, etc.) where you had saved it and double click on the file. It will re-open for you.

More Calculations

For further spreadsheet operations, let us have a set of data upon which those operations can be performed. Let us have our data, say marks obtained by some children, arranged in a table.

Student Results

	Mathematics	*Science*	*Social Studies*	*Computer Applications*	*English*	*Hindi*
Ankit	86	75	70	77	56	50
Tanuja	88	74	82	82	60	72
Laji	90	85	85	94	85	75
Nausad	94	89	92	85	79	80

Now, that is a nice table, but nothing more. If you transfer these data onto a worksheet, it will still remain a nice table. It doesn't do anything more than holding the data. Nevertheless, transfer the data onto a worksheet and save it as 'st_result'.

Selecting Cells

Before you work further with the worksheet, you need to know how to select cells. You can select a rectangular group of cells, called a **range**, in the following way.

Click on one cell and then hold down the Shift key and drag the cursor to the opposite corner of the selected area (Figure 8. 9).

Fig. 8.9 Selecting a group of cells

You have made and saved your worksheet 'st_result'. But the total marks are not worked out. You can perform different kinds of arithmetic calculations on your worksheet, but you have to first 'tell' what calculations you have in mind. This is done by either giving a formula or by pressing the appropriate icon on the Standard Toolbar.

Suppose in the worksheet 'st_result', you want to find the total marks obtained by Ankit to appear in the cell H2. You should make the program add the data given in cells B2, C2, D2, E2, F2 and G2 and give the total in cell H2. To have that done, you can give a suitable formula in the cell H2 as = B2+C2+D2+E2+F2+G2. Data in each cell will be automatically added and the total would appear in H2. Or, select these cells (B2, C2, D2, E2, F2 and G2) and click on the icon Σ (auto sum) on the Standard Toolbar. The total will appear in the next cell, i.e. H2.

Note that after we select the H2 for putting in the formula, we should start with the = sign and then the formula B2+C2+D2+E2+F2+G2.
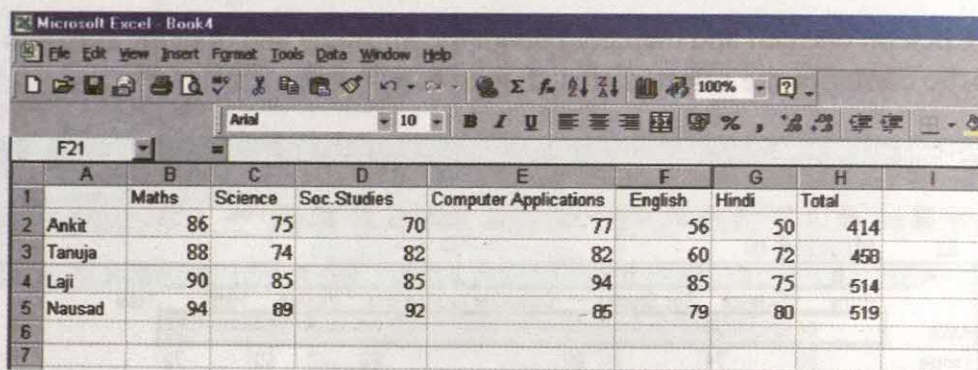
Fig. 8.10 Making calculation

Formulas in MS Excel follow a specific syntax, or order, that includes an equal sign (=) followed by the elements to be calculated (the operands), which are separated by calculation operators.

Depending on whether you select a row or a column, the menu item for a row or a column will be either available or dimmed.
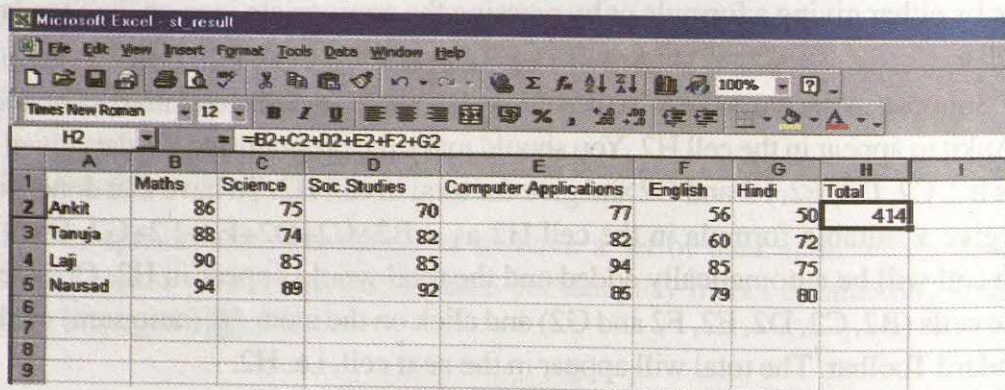
Fig. 8.11 *Showing total marks of each student*

You can see the formula in the **Formula** bar as shown in Figure 8.12 as well as in the cell H2. The computer uses the formula to do the necessary calculation and give the answer in cell H2. So the formula disappears from cell H2 and the total marks of obtained by Ankit, 414, appears. However, the formula can still be seen in the formula bar.

Fig. 8.12 *Making calculation using formula*

Now type Total in cell H1. In cell H3, enter the formula to total the marks obtained by Tanuja. The formula to be entered is B3+C3+D3+E3+F3+G3. The process can be repeated for marks of all others.

Editing Worksheets

There are occasions when you need to make some changes in data that you have already entered in the worksheet. You will probably also want to make some changes in the way you construct your worksheet. That means, you need to edit your worksheet. This is how you do that :

- Select and edit cells
- Insert rows and columns
- Copy and move data from one cell to another.

Edit Cell Content

You may want to replace the marks that Nausad got in Science, i.e. change the cell content. This will replace the old content only when the data has been selected and the new content is typed in the appropriate cell. Press Enter key (Figure 8.13).

Fig. 8.13 *Replacing the cell content*

For removing a cell, first you have to select either a single cell or more than one cell, then either go to the Edit menu, select the option Delete or click on the

Fig. 8.14 *Deleting the cell content*

Fig. 8.15 *Delete cells*
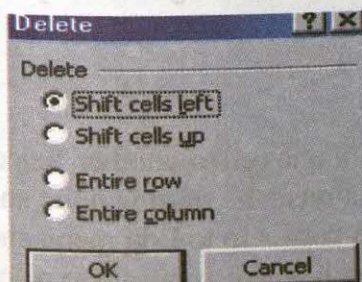
right mouse button in the cell to be deleted, then select the option Delete (Figure 8.14). A dialog box will appear as shown in Figure 8.15; you have to do according to the requirement.

Adding Rows and Columns

We made a mistake in 'st_results'. We did not add marks for Sanskrit. If we want to do it now, it requires insertion of an entire column. To add a new column, first select the column, before which the new column will appear (Figure 8.16). Then click on the Insert menu or click the right mouse button and select Insert and then Columns (or Rows, as the case may be). The new column will appear before the column which you selected, i.e. the column for Hindi will move from G to H and G will be the new column for Sanskrit (Figure 8.17).
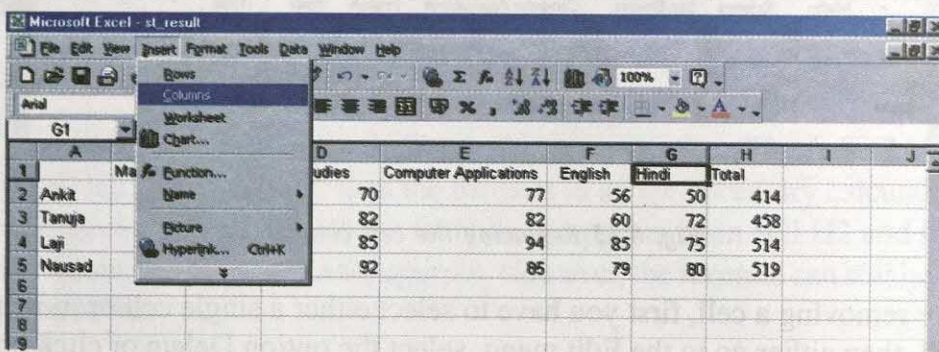
Fig. 8.16 Inserting a new column
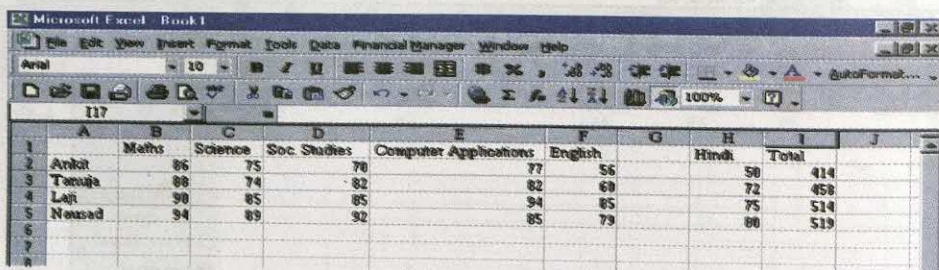
Fig. 8.17 The new column

To enter a new row, select the row that the new one will appear above. Then either click on the Insert menu or click the right mouse button, then go to the option Insert in which select the option Rows.

Copying Data

Spreadsheet programs allow users to copy the content of one cell to another. Select the cell you want to copy by clicking the left mouse button at the starting point and dragging your mouse over the entire area you want to copy. Go to Edit menu and select **Copy** or click the Copy icon 🔲 . Click on the cell where you want to place the contents. Go to Edit menu again, select **Paste** and click your mouse. Or click the Paste icon 🔲 .

In Excel (unlike in other programs), after you copy or cut a selection, it disappears from the clipboard once you have pasted it.

Formatting Worksheet

The numeric values in a cell are all aligned towards the right, while all text is aligned to the left. These are normal alignments, if you do not specify otherwise. In technical term, this is called alignment *by default*.

The table would be easier to read and would look more attractive if we could put the numbers at the centre of the column. The row and column headings would look better if they are made bold. To make those changes:

Select the row headings and click on the icon **B** for bold. Now select the column headings and make them bold in the same way. You may also convert the totals to bold.

Select the data and click on the icon **≡** to make it centre aligned . When you save the worksheet now, the new formatting is also saved.

You can change the colour of the text by using the icon **A ▾**. You can give a different colour to the heading and data for each subject. This makes it more attractive.

Other Alignment Options

You can merge cells, wrap text in a cell, vertically align and shrink text and rotate text. First click and drag the mouse arrow across the range that contains the text

you want to format. The cells will be highlighted. Click on the Format menu and select cells (Figure 8.18). A dialog box will open (Figure 8.19).
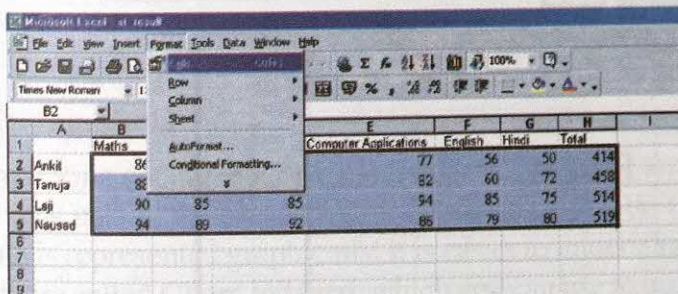
Fig. 8.18 Formatting cells
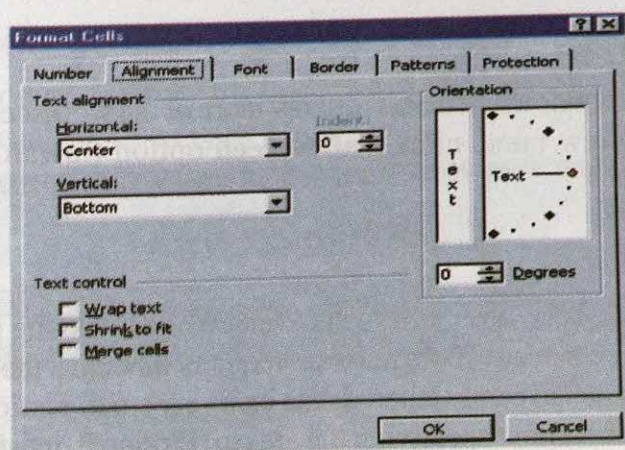
Fig. 8.19 Changing the alignment

Click on the **Alignment** tab. Click on the option you want to select: vertical alignment or horizontal alignment. Then click on OK button.

Viewing the Page

You can view the worksheet in three different modes, the normal view, page break view and full screen view, depending on how much of the worksheet you wish to see at a time.

The Normal View

To view the worksheet in a normal view select View menu and then click the **Normal** option. This is the mode for working on a worksheet.

Page Break Preview

Select the View menu and choose the **Page Break Preview** option (Figure 8.20). You can move the 'page break' by dragging it and placing it anywhere on the sheet. The page break view acts as a window to view a portion of the worksheet.
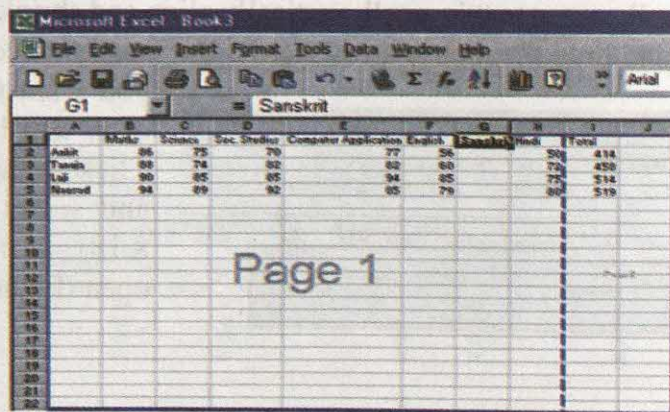
Fig. 8.20 *The page break preview*

Full Screen View

This option hides windows elements to show more of the worksheet and data on the screen. On the View menu click **Full Screen** option (towards the bottom of the menu).

Printing Worksheet

To print your worksheet, you can use the Print command on the File menu, or the print icon 🖨 on the Standard Toolbar. However, remember that the actual workbook is very large and you have only entered data on a very small portion of it. So, if you give the print order without specifying the area to be printed, most of the pages will be blank. Therefore, it is important to set your print area and also the paper orientation before printing any worksheet.

To set print area, drag your mouse over the cells (rows and columns) that you wish to print. On File menu, select **Set Print Area.** A dotted line surrounds the selected cells on your worksheet. Now select Print from the File menu, or simply click on the Print icon. Only the area set by you will be printed.

Normally, pages that we use for writing or printing are longer than wide. This is known as *portrait orientation.* If, however, the number of columns in your worksheet is more than the number of rows, the columns will not fit into the width of the paper. In such a situation you need to print the worksheet in such a way that the columns fit into the length and the rows into the width of the paper. This is known as *landscape orientation* (Figure 8.21).

To choose landscape printing, select Page Setup on File menu and click the button Landscape. Click on OK and print.
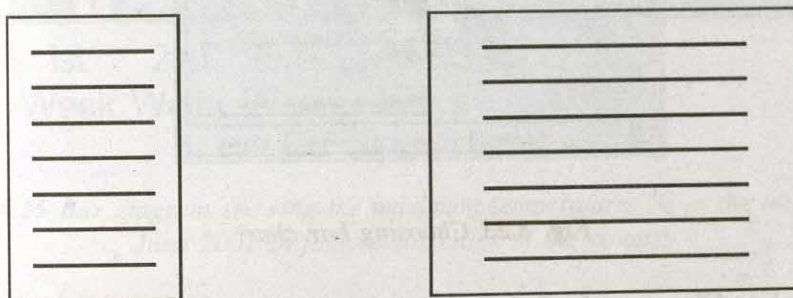
Fig. 8.21 Portrait (left) and landscape (right) orientations

Making Chart

Presenting data in the form of charts, bar graphs or any other visual representation is very useful. A spreadsheet program helps you do that with utmost ease. When data is represented graphically, it is easier to understand. MS Excel offers a special feature called **Chart Wizard**, which you can use to quickly draw a variety of charts using the data on your worksheet.

Making Bar Graph

Do you remember the 'st_result' file that we had created earlier. We can quickly bring that worksheet here (see Figure 8.22).

	Maths	Science	Soc. Studies	Computer Applications	English	Hindi
Ankit	86	75	70	77	56	50
Tanuja	88	74	82	82	60	72
Laji	90	85	85	94	85	75
Nausad	94	89	92	85	79	80

Fig. 8.22 Student results

To represent Ankit's marks in different subjects in the form of a bar chart, select cell A1, keeping the left button of the mouse pressed, drag it till the cell I2. This operation selects cells from A1 to I2, which become dark. These cells contain Ankit's name, the names of the subjects, his marks in each subject and the total marks obtained by him.
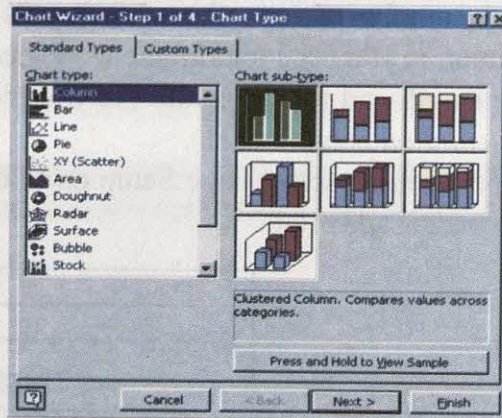
Fig. 8.23 *Choosing bar chart*

Now select **Chart** on the Insert menu. Click on it. The **Chart Wizard** offers you chart types you can choose from. The vertical bar chart is selected by default (Figure 8.23).

Press **Finish** and the chart appears on the worksheet (Figure 8.24). The program itself attaches the name 'Ankit' to the chart. It has also given the name of the subjects on the horizontal line (called the x-axis).
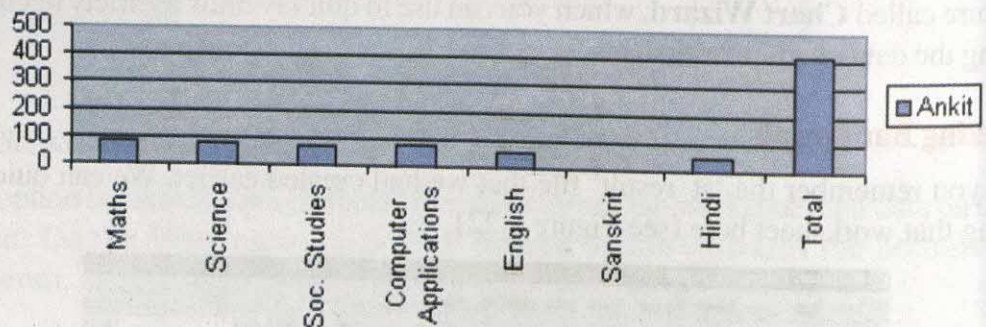
Fig. 8.24 *A bar graph of Ankit's marks*

The maximum day temperature in four major cities in the month of June, 2001 was recorded and plotted in a worksheet. Figure 8.25 shows the resultant bar graph in Excel, following the same procedure as for Ankit's result.
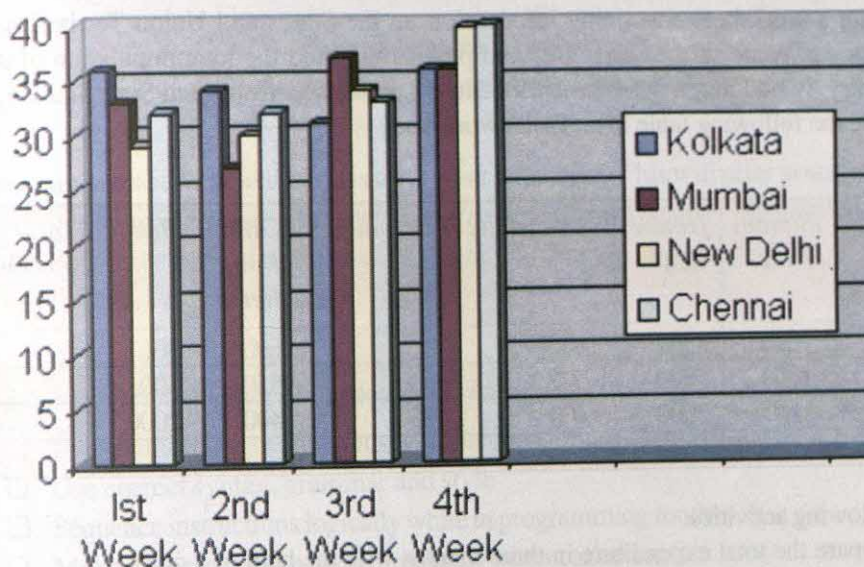
Fig. 8.25 Bar diagram showing the maximum temperatures °C in the month of June 2001 in four major cities of the country

Making Pie Chart

To represent the same data as a pie chart (although Ankit's marks may not mean much as a pie chart), select the pie chart option from **Chart Type** in the Chart Wizard. You shall be guided to Finish, resulting into the pie chart.

To Exit from Excel

Click Exit on the File menu option. A dialog box will appear. Save the document if it has not been saved previously (Figure 8.26).
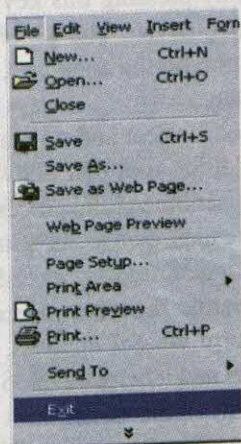
Fig. 8.26 Exit Excel

Exercise

1. Create a worksheet containing information on the States and Union Territories of India, e.g. name of the State, area and population. Find the total population of our country by building a worksheet with data on population from each State and UT.

2. Write the following table in an Excel worksheet

Month	School Fees	House Rent	Electricity	Vegetables	Other Food Items	Books	Total Expense
DEC	1000	4500	600	300	600	500	
FEB	1000	5000	500	300	550	300	
APR	1100	5000	400	350	400	2000	
TOTAL							

Do the following activities:

(a) Compare the total expenditure in three months with the help of a chart.

(b) Insert a row between February and April for the month of March and enter the data for March accordingly.

(c) Delete the second column, i.e. School Fees.

(d) Centre align all the values.

(e) Make headings Bold and Underlined.

(f) Print the Worksheet:
   (i) Landscape
   (ii) Portrait

Note for the Teacher

Too often we talk about the popularity of the spreadsheet in business and administration and describe them as tools for producing 'tables' which (unlike non-electronic tables) can be frequently changed and printed by pressing this key or that. The tables that are built applying frivolous formulae are often trivial. The general emphasis, unfortunately, is on how a spreadsheet program can be run on the computer, not on what it really is and what it can be made to do in the classroom.

Electronic spreadsheets are not for neat and tidy tables. A spreadsheet program can be used as a general purpose modelling tool that allows the user to formulate and test hypotheses. It can simulate diverse phenomena and processes and engage students in cause-effect analysis. It helps them explore their own ideas, stimulates discussion and demands a good deal of hands-off research. Unlike a paper spreadsheet, the computer spreadsheet can simulate different types of dynamic processes. Because one can quickly change the variables in a simulation and perform what-if analysis, a spreadsheet program involves students in problem-solving methods and it helps develop their inquiry skills. That is why it is a powerful learning tool. The ability of the spreadsheet to quickly perform mathematical calculations allows students to concentrate on the problem and the simulation rather than on mathematics and calculations.

Suggestions to Teachers on
Assessment of Learning Outcomes

Observe students at work and discuss their work with them. This will offer you opportunities to assess the learning outcomes. The exercises at the end of each chapter will help you in this. You may also provide additional exercises/activities to students.

A. The ability and understanding of fundamental computer operations and practices

1. Students can code and document simple program using Logo

- ❑ Use unambiguous commands while in the command mode
- ❑ Use correct syntax, grammar and style
- ❑ Sequence instructions logically while in programming mode
- ❑ Make necessary changes in programs when called for
- ❑ Can make a program more efficient if there is a scope
- ❑ Free programs from logical errors
- ❑ Make programs run.

2. After students have practised installation of a piece of software, they are able to

- ❑ Follow verbal, written or on-screen instructions
- ❑ Refer to technical manual for clarification
- ❑ Try alternative methods, if need be
- ❑ Run installed program to check if it works
- ❑ Place the program in the correct folder

3. Troubleshooting skills

As students work through some troubleshooting exercise, they may be encouraged to explain steps and preferably document them.

4. Acquaintance with and ability to use IT tools for making multimedia presentations

- ❑ Select appropriate tools for presentation
- ❑ Create multimedia presentations
- ❑ Use text, chose desired font and its size
- ❑ Use graphics: scanned image, drawn/painted image, video and audio clips

5. Technical handling of accessories

- ❑ Handle CDs properly
- ❑ Use the printer to get hard copies
- ❑ Capture image using scanner.
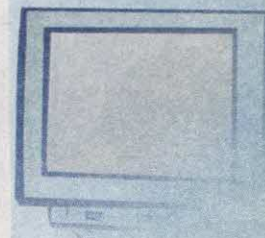
B. Social and ethical behaviour

Checklist to assess the socially responsible use of IT in daily work
- ❑ Respect the privacy of others' work and their intellectual property
- ❑ Seek proper permission, if required, when accessing information
- ❑ Take measures to prevent virus infection during different operations
- ❑ Do not visit sites that are inappropriate for them
- ❑ Use self-restraint and understand and appreciate consequences of browsing inappropriate sites
- ❑ Do not indulge in plagiarism.

C. The ability to use IT tools to accomplish tasks

Confer with students about their own plans to execute a mutually agreed task. Take note of the extent to which they feel that:
- ❑ Tasks have been assigned on the basis of their earlier experience
- ❑ Relevant goals and sub-goals have been set
- ❑ The allotted time is realistic.

1. *Examine an individual student's assignments in his/her directories on the hard disc and look for evidence that he/she:*

- ❑ Used various applications (e.g. text, graphics, hypertext)
- ❑ Produced various types of information (e.g. graphs, spreadsheets)
- ❑ Integrated different types of documents in their work and did assessment of project work
- ❑ Used IT skills in a variety of subject areas.

2. *Look for evidence that students:*

- ❑ Choose appropriate types of graphs (e.g. bar graph, pictograph, pie graph, line graph)
- ❑ Include all relevant information
- ❑ Label axes properly
- ❑ Incorporate proper legends
- ❑ Use computer aided learning packages.

D. The ability to use communication networks

Students are expected to be able to work in a network environment within the school and connected to the global network to collaborate, interact and publish.

Look for evidence that individual students can:

- ❑ Communicate with others using e-mail
- ❑ Create links to resources
- ❑ Conduct e-mail interviews.

E.   The ability to gather, process and analyse information and prepare report

Students show refined abilities to use the Internet for gathering and organising information on a variety of subject areas.

1.   *Make sure students are comfortable with a variety of search engines and ways to locate and retrieve information:*

❑   Enter Web Site addresses accurately
❑   Use the right key words to define the parameters for the search
❑   Use Boolean logic to streamline their search
❑   Use *Bookmarks* or *Favorites* to mark relevant sources
❑   Capture and download information successfully
❑   Receive/download information in desired folder.

2.   *Make sure the extent to which students consider the following as part of analysis of information:*

❑   The reliability of the information source by cross checking with other sources
❑   The author's viewpoint or bias
❑   The publication date.
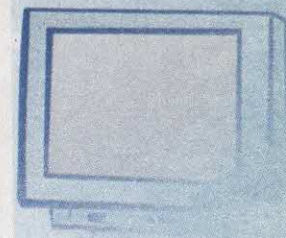
Available IT Support For Children With Special Needs

Emphasis on technology in schools has made computers available to children in educational programmes throughout the world. Books are brought to life on the screen and children explore the world from their desktops via the World Wide Web. With modifications of hardware and software, teachers of exceptional children can take advantage of this technology to enhance educational activities, communication skill and leisure time.

Impaired vision, hearing, speech or movement limits many people's abilities to communicate, learn, work and control their environment. Personal computers, combined with special devices and programs, can lessen the impact of these impairments.

Teachers working directly and indirectly with children with such impairment now need to learn when, how and where computers can best be used to help this population. Following points are to be kept in mind for effectively using computers with exceptional children:

- There are technological as well as practical limits to what computers can do.
- The teacher must know the needs of handicapped and gifted individuals who will use computers.
- The teacher must be able to instruct computers to do what we want them to do. Before a programmer can turn an idea into a set of meaningful instructions to the computers, there must be a very careful analysis and specification of exactly what is to be done, by whom, when, under what conditions and with what effect.
- The technology must be integrated into instructional, managerial and adaptive systems that are themselves effective.

The primary way in which computer technology is being used with handicapped and gifted individuals include its use as a compensatory tool (e.g., to compensate for visual impairment by providing speech output for important information on the computer screen or monitor), use in instructional management (e.g., to write, file and revise any document) and use in instructional delivery (e.g., to individualise instruction for each student).

Mildly Handicapped Individuals

The category mildly handicapped groups exceptional individuals with heterogeneous handicapping conditions. Their disabilities overlap. Mildly handicapped individuals have disabilities in learning, perception, cognition, socialisation or difficulty in appropriately handling their emotions to such an extent that they may require special education (e.g., resource room instruction) or related services (e.g., counselling) in schools. They may have difficulty in developing speech and language skills, perceiving visual and auditory stimuli, sustaining attention, maintaining short- and long-term memory, mastering basic academic concepts and interacting positively with others.

For mildly handicapped individuals, the computer helps in the educational process. These students can profit from computer programs designed to teach or re-teach basic and content skills. Computers have been successfully used to help these students achieve in such areas as reading, spelling, personal adjustment and in socialisation.

Following potentials and patterns of needs must be considered while using computers with the mildly handicapped individuals in the classroom.

Characteristics of Mildly Handicapped Individuals and Computer Attributes

Characteristics	Computer Attributes
Lack of interest for learning	Motivates student both as a producer of work and as a reward
Poor fine motor coordination	Calls for and promotes motor skills and visual-motor coordination
Need for step-by-step task	Consistent, sequenced instructional steps
Self-concept deficiencies	Peer response to access is high; built-in success; immediate reinforcement
Unique learning speed	Self-pacing, rate of presentation can be controlled
Short- and long-term recall	Easy and frequent repetition deficiencies available
Low frustration level	Repetition without pressure; immediate feedback and branching capabilities
Short attention span	Immediate feedback; active participation; reinforcing
Distractible	One-on-one use; active involvement; motivating; educational games; frequent reinforcement
Defensive	Constructive criticism without emotion or embarrassment
Non-responsive	Calls for high frequency of response
Overlapping disabilities	Minimize or circumvent missing skills (written expression without writing).

Speech and Language Disordered Individuals

Computers are being used in educational and clinical settings to assess speech and language as well as to remedy identified problems. Problems that may require special services include articulation disorders (e.g., saying "wabbit" for "rabbit"), voice problems (e.g., extreme hoarseness), dysfluency (e.g., stuttering) and disorders preventing communication or understanding (e.g., problems in using syntax or sentences). People with vocal impairments can use computer-synthesized speech. By typing messages on the keyboard for the computer to pronounce, a mute person can communicate via a telephone or with a person who cannot read. In addition, computerised message systems provide a means of rapid, long-distance communication that is especially valuable for people whose speech or hearing impairments prohibit them from using standard telephones.

Speech and Language Disorders and Types of Computer Applications

Disorder	Types of Applications
Articulation	Phonologic analysis, intelligibility analysis, drill and practice and games
Voice	Bio-feedback programs and client information
Fluency	Bio-feedback and relaxation programs

Syntactic	Language sample analysis, drill and practice, games and tutorials
Semantic	Language sample analysis and cognitive rehabilitation
Pragmatic	Problem solving and simulations
Hearing impairment	Visual feedback, sign language instruction with CAI and telecommunication applications.

Severely and Physically Handicapped

Learners with Severe and Physical Disability

Severely and physically handicapped individuals are two very different exceptional populations. The *severely mentally handicapped* are those with very limited cognitive ability. Not able to care for themselves, use abstract concepts, or learn basic academic skills, they may also be non-ambulatory, unintelligible and have other handicapping conditions. *Physically handicapped* individuals, on the other hand, have difficulty engaging in appropriate motor activity (e.g., loss of fine motor skills) due to neurologic, bone, joint, or muscle disorder (e.g., cerebral palsy, spina bifida, muscular dystrophy or the absence of limbs). Physically handicapped persons may be able to move with or without prostheses or may be totally non-ambulatory. Their intellectual abilities range from gifte/talented to severely mentally handicapped and they may also be handicapped in other ways. Some children with physical disabilities may also have sensory impairments, neurological problems and learning difficulties.

Computer applications with severely and physically handicapped individuals are diverse. They can be very similar to traditional functions or specifically related to their disabilities. Physically handicapped students use the computer for educational purposes (e.g., drill and practice). However, through adaptive devices (e.g., computer speech synthesizers), physically handicapped individuals can use the computer to compensate for the absence of an ability (e.g., the ability to talk), to help them move (e.g., computerised wheel chair) or to take care of themselves (e.g., accessing information services).

Movement Characteristics of Severely Mentally Handicapped and Physically Impaired Individuals and Computer Interface Options

Movement Characteristics	*Computer Interface Options*
Some control of upper extremities, no fine motor control	Deltoid aides, universal cuff, pointers or typing tools
Good head control	Head or mouth stick
No head control and no control of upper body	Voice input, puff and sip switches
Control of eye gaze	Eye types
Control of specific muscle (facial or otherwise)	Muscle twitch switch, EMG switch, foot switch
Unilateral control (e.g. one arm, one hand)	Keytronic keyboard, settable control switches.

Some examples of the types of control switch interfaces that can be operated using various

movement patterns are listed below.

Movement Patterns and Types of Control Switches

Types of Control Switches	Movement Patterns
Rocking Lever	Normal or abnormal upper extremity patterns
Paddle Switch	Head movement (through use of a mouthstick or headstick)
Tread Switch	
Plate Switch	
Wobble Switch	Head, arm, or gross body movement; can be normal or abnormal
Leaf Switch	Depends on placement of switch
Air Cushion Pneumatic Switch (Pressure Switch)	Head, arm, or leg movement, dependent on switch placement
Lever Switch	Head Movement
Joystick	Arm/hand movements.

Learners with Physical Disability

The ability of modern computers to run more than one program at a time (multitasking) has led to the use of add-ons to make ordinary programs accessible to those with physical disabilities. They no longer have to use different programs in order to use an alternate input device. For example, some may prefer to use mouse instead of keyboard for writing, because they do not have sufficient strength to use the keyboard, or perhaps they have problems continually changing their gaze between the vertical screen and the horizontal keyboard. These users can run an *on-screen keyboard* alongside their word processor and write by clicking on the letters with the mouse.

Input Methods

Keyboards The standard keyboard consists of the letter and numeral keys, which are usually laid out in QWERTY array, plus other keys, which perform functions such as navigation, selection and deletion.

Problems and Solutions

Keyboard is too big	Change to a smaller one Use a portable computer- **palm tops** have particularly small keyboards Change the keyboard for a **miniature keyboard**
Keyboard is too small	Change to a bigger one Use an **expanded keyboard** Use an **overlay keyboard** with a QWERTY overlay
User can only activate one key at a time	Switch on **sticky keys**
User keeps hitting the wrong keys	Use a **keyguard** Switch on the **input filter keys**

Support needed while typing	Use a **wrist rest** – a piece of wood, plastic or foam that supports the user's wrists while typing; most portable computers have areas in front of the keys where the wrists can rest
	Use a keyguard – as well as preventing unwanted key presses the keyguard can be used to support the hands
Keys keep repeating because the user cannot remove their fingers from the keys quickly enough	In the control panel of the computer set a long character repeat delay and a slow repeat rate
User cannot use a keyboard at all	Use a different input method such as a mouse or switch with an **on-screen keyboard**, or **voice activated software**

Mouse The mouse has become increasingly important in accessing the computer because graphical user interfaces display icons on screen. The user must navigate an on-screen pointer by moving the mouse around and pressing buttons on the mouse to 'click' on an icon or select text.

Problems and Solutions

Mouse is difficult to control	In the control panel set a slow pointer speed
	Replace the mouse with a trackerball
User cannot click-and-drag the mouse	Use a latching trackerball and lock the button down while moving the ball
User cannot double-click (selecting by pressing the mouse button twice within a pre-set interval)	In the control panel set the double-click speed to slow
	Use a programmable trackerball as this has an extra button that can be set to perform the double-click (or a range of other actions) with one button press
User cannot use a mouse at all	Use the keyboard – **mouse keys** alternatives in the accessibility options - which allows the numeric keypad to control the pointer and perform button actions
	Use an **overlay keyboard** – selection set can be made for overlay keyboards with areas that perform the function of the mouse in simple program
	Use switches with an **on-screen keyboard** that includes mouse control or **hotspot** software
User hits the wrong area by mistake	Fit a keyguard over the board to define the cells more clearly
	Edit the selection set to make null areas around each key, thus avoiding close proximity of sensitive areas

User does not have the control to make a single definite press	Use the board's own access utilities to customise the way the board reacts, e.g. set a delay so that the user can move around before settling on the required key, or set it to ignore repeated key presses

Overlay Keyboards Overlay keyboards are flat boards covered with a touch-sensitive membrane and connect to the computer via the serial or PS2 keyboard ports. A printed overlay is laid on top of the board and pressing areas makes choices.

Switches Switches can be used as an input if the user can understand the task and can also hit a switch and release it. The simplest use is for cause-and-effect activities where the user presses a single switch to make something happen. It might be attached to a mains controller, a simple communication aid or a simple switch program on the computer. Switches are connected to the computer through the serial or keyboard ports using switch interface or **mouse port switch adaptor.**

Voice Recognition Voice recognition software converts the spoken word into text and has been a long sought after alternative input device for many. People with physical disabilities have used it for several years but its cost and that of the hardware needed to run it have prevented more widespread use until recently. The cost of the software has plummeted and modern computers now have high enough specification to run the system. Continuous development of the software has resulted in more accurate recognition, a shorter initial training for new users and the ability to recognize continuous speech rather than diction. However, there are some accents and voices, which are less successful than others. The young child will need a high level of support during the initial learning period and the systems assume a reasonable level of both literacy and IT capability.

Key Software

Onscreen Keyboard Software Selection sets containing word banks can be run alongside a word processor or other applications so that complete words can be entered with a single key press, switch or mouse click. Some word processors include integral word banks. Word banks can be used on overlay keyboards or as an onscreen keyboard. They may contain subject vocabulary and key words.

Predictors These also run alongside other programs, offering word banks that can reduce key presses and speed up writing by providing alternative guesses for the next words and phrases to be typed. They reduce fatigue and increase accuracy in typing.

Symbol Software This may be appropriate for some learners who cannot read text or who need the support of graphics to clarify meaning.

Typing Tutors Typing tutors aim to teach the writer to type using standard fingering. This might not be achievable for many children with physical disabilities, but writers with dyspraxia may find it a useful skill to acquire.
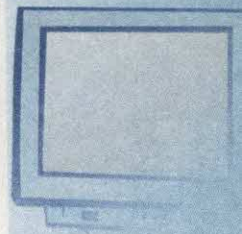
Sensory Impaired Children

Sensory impaired individuals are those who have difficulty with *vision* or *hearing* and require special education or related services. Since we learn about the world through our senses, the absence, loss, or reduction in sensory function is obviously significant. Besides requiring special methods of instruction, visual and auditory impairments slow down the process of education. Computers are having a positive impact on the visually and hearing impaired population as described in the following table.

Sensory Impaired Individuals and General Computer Applications

Exceptionality	*General Computer Applications*
Partially sighted	CAI (Computer Aided Instruction), large print video display, large print printers and speech synthesis
Blind	Speech synthesis, hard copy Braille, refreshable (paperless) Braille, text to Braille, Braille to text, text to tactile equivalent and CAI
Hearing impaired	Language development, speech synthesis, telecommunications and CAI
Deaf	Language development, speech synthesis, interactive video, real-time graphics, telecommunications and CAI

Visual Impairment

Visual impairment covers a wide range of visual conditions grouped under the categories of blind and partially sighted. Visually impaired learners face at least three sets of difficulties in their day-to-day education:

Access to information: in spite of shift to visual and audio channels, much of the world's 'educational' information is still in print format, which is inaccessible to many visually impaired learners without intervention of some kind.

Access to the curriculum: to achieve this, a learner has to use equipment, interpret pictures and diagrams, read notes from the blackboard and so on. Without special intervention of some kind many of these activities are impossible for visually impaired learners.

Personal communication: many visually impaired learners write in Braille – a code which few sighted people are able to understand. Others may write by hand but their handwriting is wobbly and difficult to decipher. Both sets of writers need tools to help them communicate with people in the sighted world.

Information technology is an excellent tool for presenting information in a range of forms. It has proved to be a powerful tool in helping to meet many of the communication and access needs of the visually impaired learners.

Enhancing Visual Sense for Partially Sighted Learners

While considering computer use by partially sighted learners, it is important to bear in mind some of the fundamental differences between paper and screen. These media differ in several significant ways that affect legibility, particularly with respect to size, resolution and display features.

Legibility of print is a crucial matter for all readers but especially so for partially sighted learners. For improving on-screen legibility, some of the features for designing the text are listed below but their application is limited because visually impaired learners have widely varied and individual needs. Consequently, the needs of some learners will diverge widely from the preferences listed here.

Contrast Text should be printed with the highest possible contrast. In most cases light coloured letters on a dark background will be the most readable combination. The computer's operating system or, frequently the software application, will let you change text and background colours.

Point Size Many partially sighted learners prefer to use large fonts. However, learners with tunnel vision prefer to work with small point sizes since magnification reduces significantly the amount of text they can see on the screen.

Leading (vertical distance between lines of text) In general it should be around 25-30% of the point size. Modern word processors allow the user to adjust the leading of the text.

Font Style It is thought that sans serif fonts are more readable than fonts with serif. This is true for both printed text on paper as well as on-screen text. Arial and Lucida are recommended for good legibility.

Letter Spacing Avoid condensed fonts as close letter spacing can be difficult for some readers to distinguish. For certain learners with central visual defects mono spaced typeface can help in preference to a proportional one. Some word processors let you control the amount of space between individual letters.

Using the Auditory Sense : Access through Speech

Visually impaired learners depend heavily on their sense of hearing to communicate with others. People with impaired vision can use computers with devices and programs for producing speech. With a *speech synthesiser*, the computer can pronounce any word that appears on the screen. This gives people access to most of the computer's capabilities.

Computer generated speech or speech synthesis (i.e., turning text into speech) means visually impaired persons can hear information rather than trying to read it, resulting in quicker information acquisition.

Voice activated software uses speech recognition technology to turn talk into text on a computer screen. This software is especially useful for learners who cannot record using either print or Braille or who have writing difficulties.

Gaining Information Using Sense of Touch

Many visually impaired learners use their sense of touch to read and write in Braille. In addition, *pattern recognition* devices and programs, combined with special output devices, make it possible for computers to translate written words into tactile patterns, Braille or speech. These systems allow people with poor vision to use any book, magazine or newspaper without being dependent upon others to read to them. The computer is also being used to produce easily read, enlarged print and electronic and paper Braille.

A special Braille printer, or *embosser*, can be used to turn electronic text into paper Braille. The quality of the Braille produced varies according to the subject matter of the text and the Braille translation software used.

Hearing Impairment and Deafness

Hearing impaired persons who have difficulty acquiring basic academic skills, understanding higher-level concepts and communicating may have difficulty in learning and adapting in and out of the schools. The pupil who cannot hear has difficulty acquiring both spoken and written language. Since the computer is largely a visual medium, it is possible for hearing impaired children to gain a great deal of information from it. Computers can also be used to generate speech or to communicate through use as a telecommunication device attached to telephone lines. Specialised applications include the use of computers, with additional hardware, to encourage and refine vocalisation. Speech therapists, rather than teachers, more commonly use the more complex and expensive applications.

Overlay keyboards are particularly useful in enabling deaf students to access mainstream software such as word processors or Logo. Many of the computer applications used for speech and language disordered individuals also apply to the hearing impaired.

Deaf-Blind Impairment

The combination of both hearing and visual impairment, i.e., **deaf-blind**, creates even greater instructional complexity for educators. The dual handicap of blindness and deafness is relatively rare. Multiple sensory impairments, particularly from birth and/or prior to language acquisition, require comprehensive and systematic educational interventions in order to make even the slightest gains in development.

An overview of computer modifications, adaptive equipment and selected software used for deaf-blind is given here. Many other modifications and programs are available that are appropriate for deaf-blind children. The examples and ideas presented here can be applied to a variety of other types of computer equipment and programs.

Input Methods

Most computer systems use a keyboard and/or mouse for input to the computer. These devices present a barrier for many deaf-blind children because of visual or physical limitations. The following suggestions address how to work with a standard keyboard or mouse as well as alternatives to these devices.

Using a Mouse or Mouse Replacement The use of a standard mouse requires good visual and motor skills. Children who are deaf-blind may be able to use a standard mouse with some modifications or they may need an alternative device.

Promoting Mouse Skill Development If it is physically possible for the child to use a mouse, design activities that encourage development of this skill. A drawing program, for example, may provide an enjoyable and rewarding activity that a child can use to learn control of the mouse. Popular drawing programs such as Kid Pix (Broderbund) and Kid Works Deluxe (Knowledge Adventure) add an auditory component to the drawing activity and provide a wide array of colours and drawing features.

Mouse Placement Placing the mouse on something such as a box brings it closer to screen and makes it easier for the child to see the direct relationship between the movement of the mouse and the movement of the pointer on the screen. Placing the mouse on a slanted surface such as an empty three-ring binder helps reinforce the concept that pushing the mouse up or down moves the screen pointer up or down.

Tactile or visual mouse cues A tactile "reminder" such as small fuzzy piece of Velcro on the mouse button helps the child locate the button and reminds him where to press. On a mouse with two buttons, the Velcro pad or a coloured dot helps the child discriminate between the two buttons.

Joysticks A joystick allows the child to control the pointer by moving the joystick in the desired direction. A foam covering can be added for those with limited grasp abilities. SAM-Joystick (R.J. Cooper) and Penny Giles Joystick (Don Johnston) have a tracking speed that is considerably slower than a traditional mouse and the buttons can be set to perform specific functions such as click, double click and lock-button-down for drag.

Keyboard Adaptations and Alternatives Standard computer keyboards present a challenge for many children. The letters and keys are small and contain numerous characters and the keys are highly sensitive. For children with good motor skills and cognitive ability, learning keyboarding skills is a reasonable goal. Many children who are deaf-blind, however, will need a keyboard alternative.

Keyboard labels Keyboard labels are stickers that can be placed directly on the keys. Zoom Caps (Don Johnston) are available in large print with high contrast.

Keyguards Keyguards (Don Johnston, TASH) have corresponding holes for each key and are used to prevent unwanted key presses. They are usually made from plexiglass and attached to standard keyboard with heavy duty Velcro. A keyguard also makes it possible for children with limited motor abilities to use keys such as Shift and Control which require two fingers, by providing a latch for each of these keys.

Slant boards A slant board can be used to position the keyboards at a different angle or bring it closer to the screen. They are good for children with motor difficulties who use a head or mouth-stick and may fatigue quickly if the keyboard is flat on the table. They are also useful for children with limited vision who do not have touch-typing skills and may tire easily because they constantly shift their focus from the screen to find letters on the keyboard. A slant board can be constructed from lightweight plywood.

On-Screen keyboards On-screen keyboards work well for children with low vision who do not require keyboarding skills. The keyboard allows the child to keep his or her head upright and focused on the screen, eliminating the need to look from the screen to the keyboard to search for letters. On Screen (R.J. Cooper) uses standard alphanumeric keyboard characters. Discover Screen (Don Johnston) lets the user design different keyboards containing letters, words, phrases and pictures.

Output Methods

Visual Outputs Visual output is a major component of most computer activities for children. Many programs contain colourful graphics, animation and video. Recent software programs also integrate sound, digitized speech and music. A child who is deaf-blind may have difficulty accessing these programs due to visual limitations and may not have sufficient hearing to benefit from the sound component.

Monitor positioning The monitor should be positioned at eye level for the child. For some children this may mean placing the monitor on a table instead of on the CPU, or using an adjustable chair or table. Monitor arms, available at most office and computer supply centers, allow the monitor to be easily adjusted.

Monitor size Typical monitors have a 13- or 14- inch screen, but monitors are available with screens up to 21 inches. Larger monitors increase the size of the viewing area. This can be beneficial when using a screen-enlargement program.

Font Size The font size of labels for applications and documents can be increased using the Views control panel on Macintosh computers or Accessibility Options in Windows 95 or 98. Large fonts make it easier for children with low vision to locate their documents and programs on the Desktop.

Sound Output

Built-in speakers Some computers have built-in speakers for sound output. Children who wear hearing aids may be able to hear sounds produced by the built-in speakers if the quality of the speakers is good.

Amplified speakers Volume and vibration can be increased significantly with the use of amplified speakers. Amplified speakers are sometimes included in computer packages.

FM system Children who use an FM Auditory Trainer can use the headphone jack in the computer with an FM unit to directly receive sounds in the FM unit.

Educational Software Programs

There are a number of educational software programs available that address learning activities such as understanding cause and effect, choice making, language development, reading and writing, maths, science, creative thinking and communication. The selection of software programs for children who are deaf-blind depends upon each child's cognitive level, educational objectives and sensory abilities.

The Gifted and the Talented

The gifted and talented are those who have very high levels of ability in understanding problem solving thinking, or creative ability. The computer is a tailor-made technology for gifted/talented persons. Many gifted/talented individuals are interested in computers and how to program them. They are adept at developing computer algorithms (i.e., the sequence of instructions to the computer) and are able to use the computer as a tool to help solve problems they encounter in other areas. And many talented individuals are using the computer to create musical compositions or pictures. Gifted children are also routinely using computers with modern capabilities like Internet surfing to access databases and information services to pursue their special interests.

Technology can enable people to be included within their communities and educational institutions. It can provide a temporary or permanent support for learners to establish their voice and achieve things that they could not have done otherwise. Technology has been a powerful tool and have a central role in reshaping the curriculum. We should be aware of the potential of IT for different special educational needs.

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3. RCINEWS – The Newsletter of Rehabilitation Council of India: Vol 2. No.2 (August 2001).

Software Evaluation Tips

Great many computer-based activities in the school are expected to be around educational software readily available in the market. Such software often acts as supplementary material in support of the traditional textbooks. But the choice of software is often subjective, may even be biased. Here are some suggestions for teachers to make their choice of software based upon a set of objective criteria.

Content Characteristics

1. The content is accurate

Possible problems in content accuracy include:

❑ Outdated information or instructional approach
❑ Factual errors
❑ Invalid model used in simulation
❑ Oversimplified models
❑ Improper use of statistics
❑ Inaccurate graphs or displays.

2. The content has educational value

This is a subjective domain. Some considerations leading to a positive judgement might include:

❑ The content is addressed in the prescribed school curriculum
❑ An instructional situation is possible where the package would be useful
❑ The content of the package is central to the subject field.

3. The content is free of caste, creed, religion and other stereotypes

❑ Certain groups may be over-represented at the expense of limiting others
❑ Some groups may be portrayed in terms that are indicative of untrue generalisations about the characteristics of that group.

Instructional Characteristics

1. The purpose of the courseware is well defined

Purpose, goals and objectives may be included in the program or be available as print materials. The overall purpose of the package should be concisely stated with specific objectives stated for specific components.

❑ Objectives are explicit, not inferred
❑ Objectives are stated in terms of expected student behaviour.

Make sure that having used the package the student is likely to learn what the material sets out to teach, rather than merely being engaged in the process.
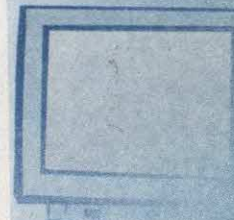
2. *Presentation of content*

This is about how the facts, concepts and principles are presented, not about the content itself.
Presentation should be clear and logical.

❑ Information is well organised
❑ The structure of the presentation is evident to the user
❑ Definitions and explanations are available when necessary
❑ Illustrations are appropriate
❑ Links are relevant
❑ Follows educationally sound principles of instruction
❑ Uses the computer's capabilities advantageously
❑ Simulations replicate vital aspect of original situation, process, etc.
❑ Simulations provide user involvement to make experience meaningful.

3. *The level of difficulty is appropriate for intended target*

❑ The readability of the on-screen text is consistent with the expected ability of the user
❑ Examples and graphic illustrations are suitable for the user
❑ There are multiple layers of information (hyperlinked) for users with all kinds of abilities.

4. *The text*

The text is expected to be original

❑ The text position on the screen is consistent and predictable
❑ The text narrative is clear and unambiguous
❑ The text, captions, labels, etc. are thoroughly edited and free of error in grammar, spelling and punctuation
❑ The text does not scroll or scramble
❑ Some words go together, e.g. 'to imagine, 'in case', 'of course', 'at all'. These word groups appear on the screen together
❑ Hyphenation is avoided.

5. *Graphics, video, colour and sound*

Graphics, video clips, colour and sound are used for appropriate instructional reasons. They do not detract from instructional purposes.

❑ Visual and auditory effects are relevant to the content and they stimulate student interest
❑ They focus attention on important content areas
❑ Colours are selected in good contrast; the use of colours is consistent throughout the program
❑ Graphics are not complicated or full of too much information
❑ Graphics are not repetitive and slow.

6. *User participation*

The program provides for a variety of student responses. That is what makes it motivational.

❑ The program is used in a 'hands-on' way rather than as a presentation
❑ It provides for a variety of student responses

❑ The student has control over input variables
❑ The student has control over the time allowed for solving problems, if any
❑ The student has control over presentation of display materials
❑ The program provides for 'Help', 'Hint' or any other additional support for the user.

Technical Characteristics

1. *Technical needs*

❑ Make sure the product is compatible with the operating system used in the school machine.
❑ The school machines have adequate RAM, hard disk size and multimedia capabilities (sound, video and CD-ROM speed or modem speed, in case it is a Web-based product).

2. *The program design and the navigational path*

The overall design of the lesson should promote the learning activities envisaged by the author. A brilliant design comes to naught if the user stumbles over minor difficulties.

❑ At any point in the lesson, the user knows where he is and where he can go
❑ What is he supposed to be doing there; how to get help if he needs it
❑ Moving from one screen to another is user-controlled
❑ Text and images that are hyperlinked are clearly indicated
❑ The minimum amount of information is displayed to achieve a particular instructional purpose
❑ At any point, the user can stop, go back to the main menu or get out of the program.

3. *User support materials*

Educational software may come with some printed materials for teachers and students. Or, the additional material may come as part of digitised information.
Materials for students may include:

❑ A guide for the use of the package
❑ Follow-up activities or reinforce the instruction
❑ Worksheets.

For teachers there may be:

❑ Suggested mode of instructional activities
❑ Pre-requisite skills necessary for best utilisation of the product
❑ Teacher directed pre- and post-instructional activities.

4. *Ease of operation*

The intended user can easily and independently operate the program

❑ The loading and running instructions are simple
❑ The program has enough internal documentation to permit ease of use
❑ Help pages and functions are provided and accessible at points of need
❑ The program does not hang or appear to be doing nothing without cues
❑ The user can exit the program at will and return to menus
❑ There are effective error-trapping devices
❑ The program can be used with a minimum of computer competencies

❑ Voices are intelligible
❑ Sound constitutes essential or integral part of the program
❑ Hyperlinks are open, i.e. there is no pre-determined sequence
❑ Allows the user to off-load some tasks
❑ Options are unambiguous.

Checklist

This checklist may be useful for you to create a structured report after you have inspected sample software from the vendors. Such checklists help take decisions on the suitability of the material for your school.

Go through the material, noting anything that strikes you. When describing specific items in the material, refer to page or screen numbers, if they exist and/or chapter or section headings.

Read through the questionnaire and tick the right box. Feel free to add extra comments, if you have any, at the end.

Product Details

1. Company who supplied the product:
2. Full name of the product:
3. Date published:
4. Approximate price:
5. Does the supplier have local technical backup for the product?
    - Yes
    - No
    - Don't know
6. Medium on which courseware is available
    - Floppy disk
    - CD
    - Network download
7. Did the program run on specified hardware/OS requirement?
    - Yes
    - Yes, but slow
    - No
8. Is stand-alone installation procedure easy?
    - Easy
    - Manageable
    - Difficult
9. How long did it take to install the product?
10. Is the de-installation of the product easy?
    - Easy
    - Manageable
    - Difficult

11. How easy it is to 'refresh' the courseware for the next user?
    - Easy
    - Manageable
    - Difficult
12. Has the grade level for which the product is meant indicated? Which level?
13. What is the best mode of use of the product
    - Unsupervised learning
    - Supervised learning
    - While teaching a particular course
14. How much of the product did you look at?
    - Less than 25%
    - About 50%
    - 75% and above

Coverage

15. How appropriate is the product for its stated level?
    - Too basic
    - Appropriate
    - Too advanced
16. Is it obvious that prior knowledge is assumed?
    - Obvious
    - Obscure
    - Can't say
17. Is the product technically accurate?
    - Accurate
    - Mostly accurate
    - Many errors
18. If there is anything obviously missing, please describe.

Presentation

19. Do multimedia features like video, graphics and sound enhance or distract from learning?
    - Enhance
    - Distract
    - Neutral
20. Did you notice any grammatical error, numbering or typographic errors?
    - None
    - Some
    - Many

Usability

21. Is the product susceptible to hanging
    - Often
    - Occasionally
    - Never
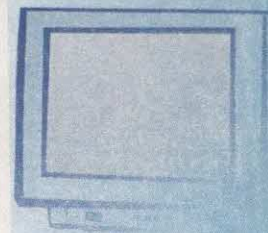
22. Is screen layout consistent throughout?
    - Consistent
    - Fairly consistent
    - Inconsistent

23. Did you feel distracted and irritated by one or more features of the product? Describe an example.

24. Could you control the pace of the material?
    - Always
    - Sometimes
    - Never

Navigation

25. Can the user interrupt and resume?
    - Easily
    - With difficulty
    - Not at all

26. How easy is it to go forward and back?
    - Easy
    - Manageable
    - Difficult

27. Do 'back' and 'forward' get you where you expect?
    - Most of the time
    - Unpredictable
    - No 'back' and 'forward'

28. Do you always know 'where you are?'
    - Always
    - Usually
    - Never

Learning

29. What are the stated learning goals? If there is none, say so.

30. Is there glossary or index? If so, is it
    - Good
    - So-so
    - Weak

31. Is there a feedback on progress through the course?
    - In all lessons
    - Sometimes
    - Never

32. Was it easy for you to achieve the stated learning goals?
    - Easy
    - So-so
    - No learning goals stated
33. Is the product correctly paced for the intended audience?
    - Too speedy
    - About right
    - Tedious
34. How would you rate this as a learning tool?
    - Excellent
    - Good
    - Poor
35. What is your overall impression?
    - Like it
    - Dislike it
    - Neutral
36. What is the major shortcoming, if any, of the product?
37. Suggest at most three ways by which the product can be improved
    -
    -
    -
38. What are the outstanding features of the product?
39. If materials from other sources you know have been used, has it been done with proper authorisation?
    - Yes
    - No
    - Don't know
40. Do you recommend this product for schools?
    - Recommend
    - Neutral
    - Discourage.

Applying checklist is a common and useful approach to courseware evaluation. But it is only one of many approaches adopted by people. It involves using a pre-existing checklist to assess a finished courseware product for the purpose of selection or assessment of effectiveness. The major advantages of the checklist approach are ease of use and availability of pre-existing checklists. Equal weighting of criteria in checklists, the use of generic criteria and failure to allow different teaching strategies are the limitations of the approach. Checklists also tend to emphasise technical, interface and usability issues, which in most instances would only be part of what you want to know.

GLOSSARY

A

Animation
A display of sequence of drawings which gives impression as if the object is moving.

Antivirus
The program (like Norton, PC-Cillin, McAfee, etc.) which scans files to detect, repair virus-infected programs and safeguard against viruses.

Application software
A set of specialised programs to carry out a particular application. A payroll program, computer graphics or word processing programs are examples of application software.

Arithmetic Logic Unit (ALU)
The part of central processing unit (of a computer) where arithmetic/ logical operations are performed.

ASCII
It is a code, which stands for American Standard Code for Information Interchange

AutoCorrect
A feature of a program that automatically corrects spelling.

B

Batch processing
Processing of a group of instructions at a time.

Bold
To display or print the text more darkly.

Browser
A software used for searching, retrieval, etc. on the Internet.

Bugs
A problem that prevents a program from working the way it is desired.

Button
Graphical representation of commands which has connections/ linkages elsewhere e.g. button for Undo will cancel implementation of the command last done.

C

CD
Compact disk or optical disk. These are flat circular secondary storage devices having large memory, e.g. 650MB. Information is read with the help of laser which is coherent beam of light.

CD drive
Acronym that stands for Compact Disc drive. It is a hardware component of the computer that houses and plays CDs.

Cell
The intersection of rows and columns in a worksheet of a spreadsheet program or in a table of a word processing program.

Chat
Communicating on-line on the Internet.

Click on
Perform an action by using mouse to select a button, menu or place cursor at specified location.

Client Server Network
A network where some programs and files are stored in one computer can be shared by all computers. Each computer connected to the network can also run on its own.

ClipArt
A program having store of wide variety of readymade pre-drawn pictures, photographs, sounds and video clips that one can copy and insert in documents / worksheets or presentations.

Clipboard	An invisible window holding copied or cut data e.g. for shifting picture from one location to another. When we cut/copy it from original location, the picture gets attached to clipboard.
Close	To exit an activity or file or program.
Command	Portion of an instruction which specifies the operation to be performed.
Computer System	Is a central processor together with its associated peripheral equipment. It is the complete assembly, hardware and software, with CPU, memory, input and output (I/O) devices, plus any other device for an intended application.
Conditional Statement	The statements of a program which are valid only in certain situations.
CPU	Is an abbreviation for Central Processing Unit. It is the computer module in-charge of fetching, decoding and executing instructions. It contains a control unit, an ALU and other related facilities.
Cursor	A blinking mark on the screen facilitating the user about placement position of next input on the screen within a program. It may look like an arrow, a square, a finger, etc.

D

Data	Denotes any or all facts, numbers, letters and symbols that refer to or describe an object, idea, condition, situation or other factors suitable for communication, interpretation or processing by people or by automatic means.
Debugging	The process of eliminating problems (bugs) in a program.
Default	A standard setting by software or hardware till the user does not change it.
Desktop	The background of the screen on which windows icons and dialog boxes appear.
Delete	This command shifts a file/folder to the recycle bin or deletes the selected portion.
Directory	Collection of files and folders under some pre-designated name. It is also called folder.
Disk	Is a flat, circular magnetic/optical medium used to store data.
Document	A file created by a word processor or desktop publisher program.
Documentation	Print material needed to document a computer application, including (usually) problem statement, flowcharts, coding and operating instructions.
Domain name	Unique name of server computer system which handles Web Pages, delivery and receipt of e-mails, etc. The part of an e-mail address after @ is domain name of the site, e.g. in crc@**giasdl01.vsnl.net.in** the portion with bold letters is domain name.
Double click	To press left button of the mouse twice in rapid succession without moving the mouse between clicks.
Download	To transfer a file from one computer system to another. One can download a program from the Internet.

Drag and drop	Holding down the left mouse button and moving the mouse until a desired location is reached, and then releasing the left mouse button to drop the item.

E

Edit	To carry out modifications in a file.
e-mail	Abbreviation for electronic mail. Takes a message from one computer to another computer anywhere on globe.
Error message	A display on screen showing error in program execution or input.
Exit	To close an activity or program

F

File	It is a block of information. It can be lines of text, document, data, graphics, worksheet, program, etc.
Floppy disk	A magnetically coated disk to store information.
Floppy disk drive	A drive that facilitates reading from and writing on a floppy disk.
Folder	A portion of disk (hard or floppy) that we designate to store information. It may contain subfolders and files. It is also called directory.
Font	A collection of characters with predefined size and style.
Format	To prepare a floppy or hard disk for storing information.
Formatting text	Some standard ways of representations of text. For example, one can put data in Times New Roman with font size 12 and font style as Italic or Bold.
FTP	Abbreviation for File Transfer Protocol. It is one of the Internet services to retrieve and copy files from a remote computer.

G

Gigabyte	Approximately one billion bytes.
Graphics	Is the representation of information by a computer in visual form.
Graphic tablets	An input device used for drawing on the monitor by putting pressure on a pad.

H

Hard copy	Printout of a document, worksheet, presentation slides, etc. on paper.
Hard disk	Is a hardware component of computer. Basically, it is a magnetically coated metal/plastic disk, sealed in a box. It stores massive amount of data.
Hardware	Is the physically existing components of a computer system, e.g. the monitor, keyboard, mouse, etc.
Homepage	The first page of a web site.
HTML	Stands for Hypertext Markup Language. A document in HTML can be seen through a browser software.

HTTP	Stands for Hypertext Transfer Protocol. This is a protocol through which hypertext pages are transmitted.
Hub	A hardware device which connects a number of workstations to the server.
Hyperlink	Interconnections of a Web of information.
Hypertext	Organisation of text materials into sections which have linkages.

I

Icon	A small picture on the screen often used in place of words. Many computer programs display icons on the Desktop as shortcuts to execute certain commands or programs or files.
Import	Transfer of data from one application to a currently running application.
Information	Meaningful data is called information.
Input	The data fed to the computer.
Input command	An instruction to feed data to computer.
Input Device	Peripheral units which can accept data presented in a machine-readable form, decode it and transmit it as electrical pulses to the CPU.
Instructions	Commands given to the computer for doing a specific job.
Inbox	The folder in an e-mail program containing received messages.
IP	Stands for Internet Protocol. It is the protocol that ensures the passage of packets of information to the right destination.
IP address	It is the unique address of a computer on the Internet (e.g. 146.23.101.25).
ISDN	Acronym for Integrated Service Digital Network. It is a fully digital line which can transmit data in any form, like text, image, voice, etc. over a telephone line.

J

Joystick	Is a device for analogue-to-digital conversion where input is the movement of control lever in two dimensions.
Justification	Alignment of text within margins of a page or in a textbox. It can be left, right, center, left and right both.

K

Keyboard	Is a group of buttons on a pad used to input information into a computer system manually. A computer keyboard consists of the standard typewriter keys, numeric key pad and function keys.

L

LAN	Stands for Local Area Network. A system containing more than one computer communicating with each other and sharing resources.
Left mouse button	The button on the left side of the mouse.

Light Pen	A device which, when placed against a monitor screen, can be tracked by the computer. It is used to select data on the monitor and sometimes to trace information as input to a program.
Logo	A programming language specifically designed for teaching children to create little designs using a computer. It contains an imaginary turtle which is controlled by Logo commands/ instructions.
Logoprimitive	A Logo primitive is a basic Logo command.
Logo procedures	A set of instructions/commands defined to do certain task, e.g., drawing a square with Logo.

M

Megabyte	It is approximately 1,000,000 bytes of data.
Memory	The storage facility of a computer, capable of storing a definite amount of data.
Menu	These are means for presenting a list of choices e.g. File, Edit, View, etc. are menus in a program.
MICR	Acronym for Magnetic Ink Character Recognition. It reads by sensing shapes printed with magnetic ink.
Modem	Acronym for Modulator/Demodulator. A device for sending and receiving computer data over a telephone line.
Monitor	A display device (like TV) used for display of computer input and output.
Mouse	A palm-sized button operated pointing device that can be slid on a spherical wheel. It is used to control movement of cursor on the screen, selection and implementation of commands, etc. It may have two or three buttons.
Mouse pad	A flat piece of material which provides a smooth surface to mouse for scrolling.
Mouse pointer	Little symbol on the screen whose movement is controlled by the mouse.
Multimedia	A program combining text, audio, video, graphics, pictures, voice, etc.

N

|	
Network	A group of computers (and printer) connected to share information/ resources and communicate with each other.
Newsgroup	Effective means to share articles/messages on a variety of topics through the Internet.
Node	Every single computer connected to the network.

O

OMR	Stands for Optical Mark Recognition. It reads position of marks on a paper and then inputs to computer.
On-line	It is the state of being connected. For example for surfing the Internet we have to be on-line to the Internet.
Open	To start a program or display/ present content of a file.
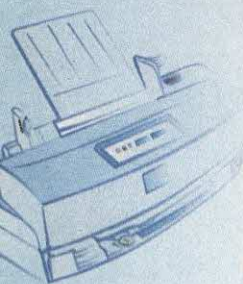
Operating system	The software which manages the hardware and logical resources of a computer system, including device handling, process scheduling and file management.
Optical Bar Reader	The devices which read bar codes (usually series of black and white lines on the packing of products) and translates the information into digital form.
Output	The result of processing from a device like the computer. It can be still or animated character / picture/ graphic/ worksheet, etc. on monitor, sound from speakers, printed paper from the printer, etc.
Output Device	A peripheral device which translates signals from the computer into a readable form suitable for re-processing by the computer at a later stage.

P

Paddle	Is a general name for a hand held device used for computer games.
Paint	It is a program which facilitates making free hand drawing with different effects (like rub, spray colours, rotate, etc.) electronically on screen.
Parallel port	Is a jack on the rear side of a computer for placing device for getting signals running in parallel – meaning that a number of signals travel through the port simultaneously (as opposed to serial port, through which the signals travel one after the other).
Parameter	A number, letter or word which can be a value of any variable.
Peripheral	Is the term used to describe an input, output or backing storage device, which can be connected to the CPU.
Portrait	Orientation of page when printing is widthwise on the page.
Pointer	Another term for cursor.
Polygon	A closed shape made up of straight lines and having more than two sides.
Primary memory	It is the internal storage within computer that stores the unprocessed and processed data as well as the program instructions. It has limited capacity and is temporary in nature. RAM is primary memory.
Print preview	Gives a view on computer screen how a document/file will appear on paper.
Printer	Is an output device for printing.
Procedure	A set of instructions to perform a specific task, e.g., procedure for drawing a circle.
Processor	It is a hardware component which decodes and executes program instructions. Every computer has a processor.
Program	A complete set of instructions or statements structured in such a way as to specify an algorithm/ flowchart in order to accomplish a given task.
Programming language	Is an artificial language constructed in such a way that people and programmable machines (e.g., computer) can communicate with each other in a precise way.
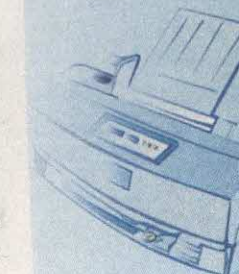
Protocol	A set of rules or procedures for exchanging information between networks or computer systems.

R

RAM	Stands for Random Access Memory. It is the memory which may be read from and written to by the programmer during program execution. It is a volatile memory.
Random number	The numbers which are generated without any order/ sequence e.g., throwing a dice.
Real-time processing	The process in which the system is geared to accept data relating to an activity, to process it and to produce an output immediately.
Reboot	To restart the computer. When computer hangs, we restart the computer by rebooting.
Recursion	Is a process that occurs when a software procedure calls itself while running.
Recycle bin	A folder on the hard disk. When a file is deleted it goes to recycle bin folder from where it can be restored. To permanently delete a file from hard disk one has to further delete it from recycle bin folder.
Repair	To remove a virus from a file and bring the file to its original state, i.e. uninfected file.
Restore	To return to normal position, e.g. when a deleted file is restored from recycle bin folder, it comes to its original location.
ROM	An abbreviation for Read Only Memory. The programmer cannot write on ROM. The software in the ROM is fixed during manufacturing. However, the user can read (and use for definite purposes) what the software has to offer.
Row	A horizontal array of data.
Run	To execute a program.

S

Save	To store data or file for later use.
Scanner	A device which converts images, documents, etc. into digitized form.
Screen	The part of monitor which displays an image.
Scrolling	The movement of the content of the monitor (screen) up/down or left/right on the screen.
Scroll bar	These are horizontal or vertical rectangular strips, usually appearing at right and bottom side of a window on the screen that enables the user to pan across the screen. Horizontal scroll bar allows us to view widthwise while vertical scroll bar is for lengthwise view.
Secondary memory/ storage	It is backing storage like a floppy. Information stored on it can be retrieved by feeding it into the computer's primary memory via an input device.
Search	To look for a particular character/word in a file or document on the Internet.

Search engines	The programs which help in searching information on the Internet. Alta Vista, Google, HotBot are some of the search engines.
Serial Port	See parallel port.
Server	It is the master computer to which all other computers of a network are connected.
Shortcuts	Substitute of a key combination that can be clicked to do a particular task.
Simulation	The imitation of certain behaviour of a system, or of some aspects of that behaviour, by another system. The imitation may be in the form of a model that can be manipulated by a computer or a device under the control of a computer to achieve the imitation.
Software	The set of instructions that tells the hardware to do something with the data. Software is not a physical component. MS Word and Paint are examples of software.
Sound	Noise, speech or music which comes out of speakers.
Speaker	Hardware connected to the computer for noise, speech or music output.
Spell check	The process of examining a word for correct spelling. It is in-built facility in a word processing program which offers possible corrections when it finds a word which it does not recognise.
Spreadsheet	A program that manipulates data in the cells of a table and displays them on the screen. The cells contain numerical data and formulae, or text or date, etc. A spreadsheet can be used for 'what-if' analysis and many other applications involving tables of numbers with independent rows and columns. It is commonly used as a general purpose simulation tool.
Status bar	Information about current command or status of cursor, etc. are displayed on status bar which is normally at the bottom of a window.
Subfolder	Folder within a folder.
Surf	To search information on the Internet.
System files	The files that make up the operating system.
System programs	The programs which enables the hardware to function.

T

Table	A way of presentation of data in rows and columns.
TCP	Stands for Transmission Control Protocol. The protocol which breaks the information into small packets for transmission through the Internet. It also reassembles these packets at the destination
Title bar	The horizontal bar at the top of the screen which displays the name of file along with the name of software on the left and on the right side shows buttons to minimize, restore/maximize and close the window.
Tool bar	A display containing a set of tools for doing certain specific jobs.

U

Undo
Cancellation of the most recent action. It puts the user back to where he was before.

V

Variable
A data item whose value can vary.

Virus
A self-replicating program written intentionally to alter the way the computer operates without the user's knowledge. These programs can do severe damage to the contents of documents/ files, etc.

Virus scan
Systematic search for detection of any virus in the file with an antivirus program like Norton, PC-Cillin, etc.

W

WAN
Stands for Wide Area Network. The computers in WAN are connected through telephone lines/ microwave, satellite links, etc.

Web page
A document written in Hyper Text Markup Language that can be seen through a browser program like Netscape, Internet Explorer, etc.

Web directory
Organization of web documents according to broad division of topics like Arts and Humanities, Sports, etc.

Window
A section of monitor/ screen dedicated to displaying specific types of data, information or program.

Windows
An operating system.

Word
A group of bits the computer recognises and processes at a time.

WordArt
Special text effects in the word processor program Word.

Word Processor
A computer program for writing, editing and formatting letters, reports and books, etc. MS Word, Word Perfect and Windows Write are word processor programs.

Work Area
Area on the screen where the user is currently carrying out his work.

Worksheet
A grid of rows and column, part of a workbook in a spreadsheet program (like MS Excel).

Workstation
See node.

Worm
These are harmful programs different from viruses, which spread from one computer to another but do not replicate.

Z

Zip drive
A hardware for housing zip floppy. It can be attached to a computer. Data can be saved on zip floppy.

Zip file
A file that has been compressed using PKZIP or a similar program.

Zoom
A way to enlarge the area for viewing on screen.